



S.N o	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						U P V	R H T	Carbonation	
									UPV reading are in excellent to good range
					Pier I	1	1	1	Overall structure is in good condition. UPV reading are in excellent to good range
					Pier II	1	1	1	Overall structure is in good condition. UPV reading are in excellent to good range
					Abutme nt II	1	1	1	Overall structure is in good condition. UPV reading are in excellent to good range

Table 110. Summary of Condition and NDT details of Major Bridges



Figure 107. Photographs of test conducted (Ultrasonic pulse Velocity, Rebound Hammer and Carbonization test)

S. No.		1
Structure No.		198/1
Chainage		196+023
Type of Structures		T – Beam
Span Arrangements		1 x 12.00 1X32.00
Details of Protection Work	Type	Crash Barrier
	Condition	Good

Present Condition of the Bridge	Abutment	Good
	Piers	Good
	Slab	Good
	Bearings	Good
	Parapet	Good
Condition of various features of bridge	Carriageway surface	Good
	Drainage Spout	Good
	Return wall / Wing wall	-
	Head wall	Good
Remarks		Removal of debris from expansion joints & removal of vegetation from side slopes required

Table 111. Summary of Condition details of ROB



Figure 108. Photographs of the condition of ROB 198/1

#### 5.4. DRAINS

As per condition survey findings it is evident that most of the existing drains are in fair/good condition. Details of existing drains on the project stretch are 1.435 kms are median drain, 18.915 kms drain exist on LHS side including drains in service roads and 14.488 kms drain exist on RHS side including drains in service roads.





### 5.5. REPAIR / IMPROVEMENT WORKS

As per condition survey findings it is evident that most of the structures are in good condition. Protection works and expansion joints, etc. are minimally distressed. All type of distresses and their solutions for repair and rehabilitation measures are given in Annexure Structure.

BOQ has been prepared for routine maintenance viz. greasing of bearings, cleaning of drainage ducts, repair of Parapet walls and crash barriers and repair of pitching and accidental damages.

*Note:-*

Additional financial implications due to improvement of road safety features are considered in Cost estimate/BOQ for various items viz: safety issues on minor junctions along project stretch, deficiencies in safety barriers, curves delineation, u-turn, unauthorized ramps and accesses, deficient signage along the highway, Provision of service road/slip lanes and Provision of ATMS .

## 6. ROAD SAFETY AUDIT

### 6.1. GENERAL

Road Safety Audit (RSA) of the Project Stretch KothakotaBypass(Ch. 135+469 Km) - Kurnool (Ch. 211+000 Km) of total length 74.622km was carried out along the project stretch in order to assess the current situation and to suggest improvement measure.

This chapter covers the following issues:

- Identifying issues related to Road Safety along the Project Stretch.
- Improvement Proposals for these identified issues/locations along the Project Stretch.

The first task was to collect and review the available historical data for the accidents that have occurred in the highway stretch. The analysis of accident data can help to identify patterns that could be linked to safety deficiencies on the road. The accident data for the Project Stretch is given in the following table.

Accident Summary for April 2018- December 2020						
Month	Total Accidents Nos	Fatal Accident Nos	Major Nos	Minor Nos	Severity Index	No. of Persons Injured per 100 accidents
April	64	9	38	17	14.06	85.94
May	75	4	40	31	5.33	94.67
June	97	9	55	33	9.28	90.72
July	76	6	41	29	7.89	92.11
August	78	9	43	26	11.54	88.46
September	82	4	52	26	4.88	95.12
October	90	4	53	33	4.44	95.56
November	107	10	71	26	9.35	90.65
December	100	11	57	32	11.00	89.00
January	53	4	30	19	7.55	92.45
February	50	4	26	20	8.00	92.00
March	52	6	30	16	11.54	88.46
<b>Total</b>	<b>924</b>	<b>80</b>	<b>536</b>	<b>308</b>	<b>8.74</b>	<b>91.26</b>

Table 112. Accident Data along Project Stretch (Source: NHAI)

Notes: - Year 2018 includes from April to December.

- Year 2019 includes from January to December.

- Year 2020 includes from January to December.



- Severity Index: Number of Persons Killed per 100 accidents.

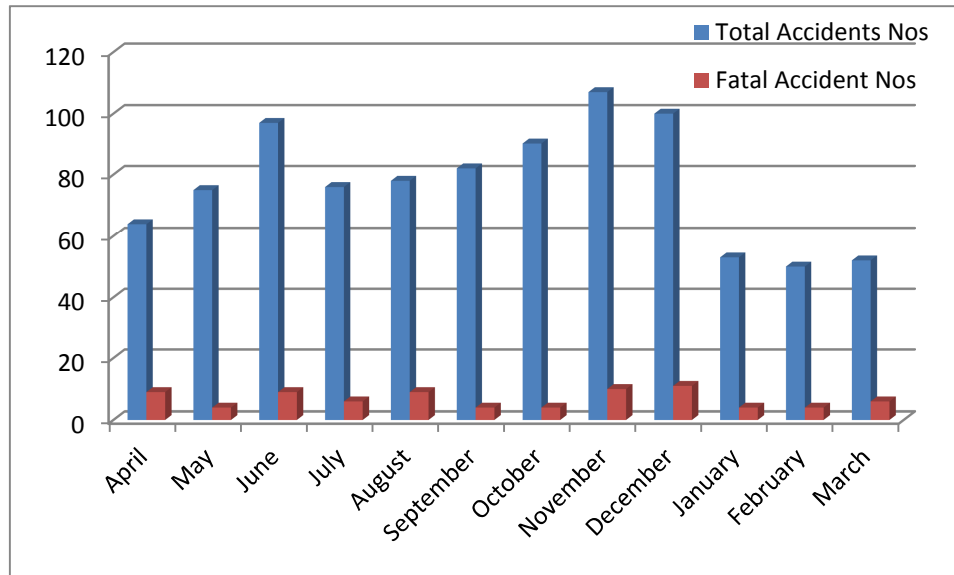


Figure 109.Monthly Accident Data along Kothakota bypass – Kurnool Section

Accidents from **April 2018- December 2020** were studied, and it was observed from the accident data provided that there is no evidence of any particular black spot due to particular conditions of the highway.

Considering the Severity Index of this stretch the average of the period under study was 8.74, and the nationwide Severity Index for 2015 amounted to 29.1 (road accident death per 100 accidents, source :- road accident in India-2018 published by morth). Consequently, this stretch of highway from Kothakota-Kurnool seems to present a relatively very low Severity Index when compared with the whole country.

As a result of the Road Safety Audit the following safety concerns were identified:

- Broken median along the Project Stretch
- Safety Issues on Junctions along the Project Stretch
- Deficiencies In Safety Barriers
- U-Turn – Median opening
- Unauthorized Ramps along the Project Stretch
- Improper Pedestrian Crossing along the Project Stretch
- Current Situation of Truck lay-byes, Bus bays and Bus Stops along the Project Stretch
- Provision vehicular underpass
- Provision of ATMS along the Project Stretch

## 6.2. MAJOR SAFETY ISSUES FOR IMPROVEMENT ALONG THE PROJECT STRETCH

### 6.2.1. BROKEN MEDIAN ALONG THE PROJECT STRETCH

The median width is 4.5 m throughout the length of the project corridor.

During the site visit, it was observed that, there were number of unauthorized median cuts along the Project Stretch created by local residents to cross the highway by bikes, cars or as pedestrians. As can be seen in photographs below, these kind of median cuts are hazardous since enough warning is not available to fast

moving traffic along the main carriageway. Especially during night times, these are operating at very high risk level and could lead to side on collision.



Chainage : 144+200

Chainage : 166+200



Chainage : 169+800

Figure 110. Photographs showing unauthorized median cuts

Unauthorized medians along the highway stretch can be seen in the table below.

Sr. No	Chainage	Problem and Improvement Strategies
1	144+200	Median broken (Should be closed)
2	166+200	Median broken (Should be closed)
3	169+800	Median broken (Should be closed)

Table 113. Problem and Improvement Strategies for Medians

*Note:- Closure of unauthorized median opening has been taken up by Authority and will be completed prior to handing over of the stretch to InvIT.*

### 6.2.2. SAFETY ISSUES ON MINOR JUNCTIONS ALONG PROJECT STRETCH

There are a total 70 junctions on this highway project Kothakota Bypass-Kurnool, which needs to be improved, list mentioned in Table 116, these can be classified as T- junctions, Y- junctions and Cross junctions.



Majority of minor junctions along the Project Stretch are meeting abruptly with the main carriageway. The main issues observed at minor junctions are as below:

- Minor junctions meeting main carriageway at steep gradient leaving no leveled space for vehicles waiting at junction, resulting in improper visibility at junction.
- Improper acceleration and deceleration lanes for traffic merging from minor road and traffic diverging to minor road respectively.
- Improper visibility of approaching minor junction for main carriageway traffic and vice a versa. As per the junction visibility requirement, visibility triangle at the junctions should be kept free from any obstructions blocking visibility.
- Road studs are absent making difficult to follow the path at night.
- Inadequate lighting condition at crossings which makes the visibility at night very difficult.
- Maintenance of road marking and signage.
- Channelizing islands are absent to separate different traffic directions.

Above issues are shown in some of the photographs below:



Chainage : 136+250

Chainage : 137+800



Chainage : 158+750





Chainage : 163+600

Chainage : 173+000



Chainage : 186+150

Figure 111. Photographs of improper minor junctions

The following are the minor junctions which require improvement for safe movement of traffic:

S.No	Chainage (Km)	Side	Type	Improvement Strategies
1	136+210	RHS	Y	Provision stop line, acceleration and deceleration lane
2	139+300	LHS	T	Provision stop line, acceleration and deceleration lane
3	140+200	RHS	T	Provision stop line, acceleration and deceleration lane
4	141+850	LHS	T	Provision stop line, acceleration and deceleration lane
5	143+050	RHS	T	Provision stop line, acceleration and deceleration lane
6	144+250	LHS	T	Provision stop line, acceleration and deceleration lane
7	145+300	RHS	T	Provision stop line, acceleration and deceleration lane
8	149+650	RHS	Y	Provision stop line, acceleration and deceleration lane
9	149+800	RHS	Y	Provision stop line, acceleration and deceleration lane
10	153+200	LHS	Y	Provision stop line, acceleration and deceleration lane
11	156+000	LHS	T	Acceleration and deceleration lane
12	159+200	RHS	T	Provision stop line, acceleration and deceleration lane
13	159+350	RHS	T	Provision stop line, acceleration and deceleration lane
14	161+050	RHS	Y	Provision stop line, acceleration and deceleration lane
15	163+100	RHS	Y	Provision stop line, acceleration and deceleration lane
16	170+300	RHS	T	Provision stop line, acceleration and deceleration lane
17	172+950	LHS	T	Provision stop line, acceleration and deceleration lane
18	173+950	LHS	Y	Provision stop line, acceleration and deceleration lane



S.No	Chainage (Km)	Side	Type	Improvement Strategies
19	183+600	LHS	T	Provision stop line, acceleration and deceleration lane
20	187+230	LHS	T	Provision stop line, acceleration and deceleration lane
21	189+550	LHS	Y	Provision stop line, acceleration and deceleration lane
22	193+200	LHS	T	Provision stop line, acceleration and deceleration lane
23	194+610	LHS	T	Provision stop line, acceleration and deceleration lane
24	194+610	RHS	T	Provision stop line, acceleration and deceleration lane

Table 114. Identified Minor Junctions for improvements

Note:- For Major and Minor junctions improvement works (*Lighting, rumble strips, signage, road studs, Stop line and stop sign*) has been taken up by Authority and will be completed prior to handing over of the stretch to InvIT.

From the above photographs it is clear that:

- There is no identification of the access roads meeting the Project Stretch.
- No provision for acceleration and deceleration lanes for merging and diverging traffic from minor road.
- Poor/ Improper visibility at junction due to steep gradient.
- Improper visibility of approaching minor junction for Project Stretch Highway traffic and vice a versa due to obstructions.

It is suggested that apart from desired geometric improvements, following provisions shall be provided at minor junctions for safety of road users:

- Proper Road Markings for turning Traffic, as per IRC 35: 1997.
- Provision of acceleration and deceleration lane.

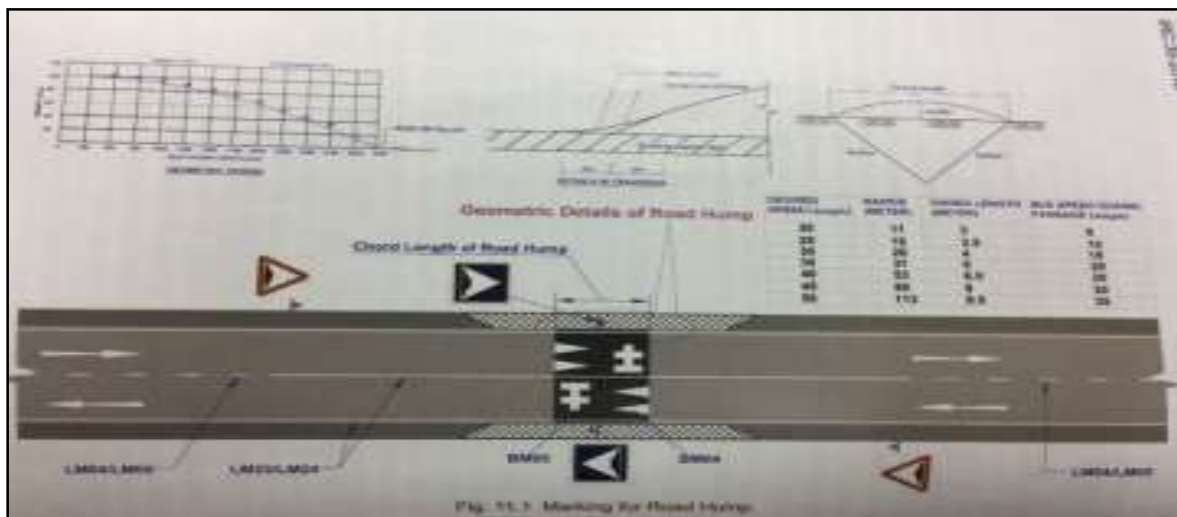


Figure 112. Pavement Marking and Signboard for the Speed Breakers

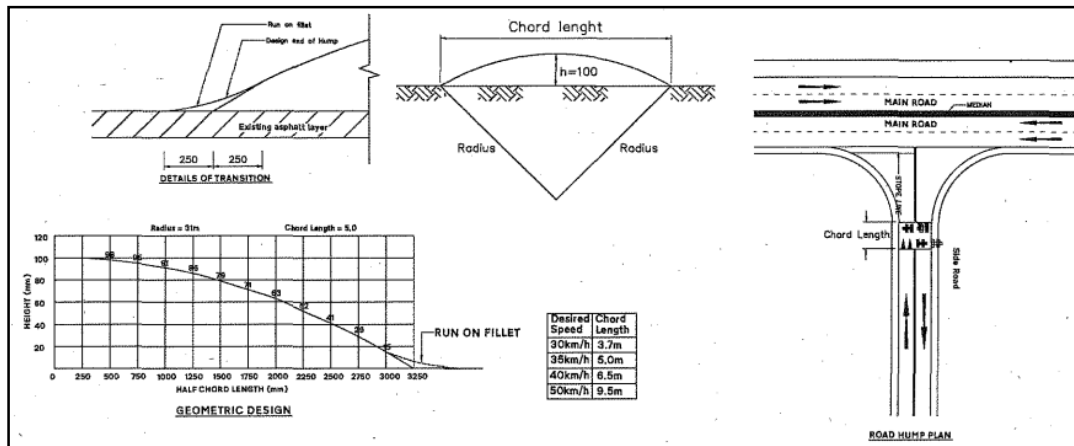


Figure 113. Design Details of Speed Breakers as per IRC: SP: 84-2019

### 6.2.3. DEFICIENCIES IN SAFETY BARRIERS

The following are the various type of deficiencies found along the project stretch.

- Safety Barriers along curves: Safety barriers along these curves shall be maintained to continue a safe operation of vehicles along these sections. Some of these locations have been shown in below figures and tabulated in Table below.
- Safety Barriers along high embankment sections: As per the site visit, high embankments on stretch are present with no protection work done. So it is recommended that safety barrier as per IRC: 119-2015 shall be provided at these locations. Such locations are tabulated in Table below.
- Safety Barriers along built-up areas sections: As per the site visit, it observed that built-up areas on stretch are present with no protection work done. So it is recommended that safety barrier as per IRC: 84-2019 to be provided at these locations. Such locations are tabulated in Table below.

Some of the Photographs related to deficiencies in safety barriers as observed presently are as follows.



Chainage : 140+400

Chainage : 135+650



Chainage : 138+900

Chainage : 156+300



Chainage : 202+100

Figure 114. Photographs of deficiencies in safety barriers

The following table identifies the locations where deficiencies were observed related to safety barriers.

S.No	Chainage (km)		Length (m)	Location	Type of Barrier	Reason
	From	To				
1	135+650	135+850	200	RHS	W-beam	Curve
2	138+900	139+150	250	BHS	W-beam	Embankment
3	139+600	139+750	150	BHS	W-beam	Embankment
4	140+300	140+800	500	RHS	W-beam	Embankment & Builtup
5	140+900	141+100	200	BHS	W-beam	Embankment



S.No	Chainage (km)		Length (m)	Location	Type of Barrier	Reason
	From	To				
6	146+100	146+300	200	BHS	W-beam	Curve (need extension of w beam)
7	152+250	152+400	150	RHS	W-beam	Embankment
8	156+300	156+500	200	RHS	W-beam	Builtup area
9	163+300	163+400	100	LHS	W-beam	Embankment
10	165+600	165+750	150	BHS	W-beam	Builtup area
11	165+900	166+200	300	BHS	W-beam	Builtup area
12	177+350	177+600	250	RHS	W-beam	Embankment
13	177+500	177+550	50	LHS	W-beam	Embankment
14	189+850	190+100	250	LHS	W-beam	Embankment
15	190+800	191+100	300	LHS	W-beam	Embankment
16	191+400	191+600	200	BHS	W-beam	Embankment
17	192+650	193+000	350	BHS	W-beam	Embankment
18	202+100	202+600	500	BHS	W-beam	Builtup area
19	205+900	206+500	600	BHS	W-beam	Builtup area
20	206+520	206+600	80	BHS	W-beam	Builtup area

Table 115. Identified Locations along the Project Stretch for Safety Barriers

Note:- All requisites safety barriers observed in year 2018 are under implementation at the level of authority and will be completed prior to handing over to InvIT.

Typical configuration/ layout of crash barriers will follow the standards as per IRC- SP: 84 -2019.

#### 6.2.4. U-TURN - MEDIAN OPENING

Median Opening should generally be limited to intersections with public streets or major generators of traffic or those that are fixed by standards. However, these openings should not be accepted for individual business needs or with inappropriate location or geometrical layout that can produce a safety risk. Their number should be kept to the minimum. During road safety audit improper u-turn and median opening have been observed.

Some photographs below are showing Improper U-Turns along the Project Stretch.





Chainage : 161+000

Chainage : 166+300

Figure 115. Photographs of U-Turn – Median opening

In Road Safety Audit Study, Locations of Improper Median Cuts along the Project Stretch were identified. The details related to the locations of such cuts are given in the following table.

S.No.	Chainage	Problems and Improvement Strategies
1	136+200	Improper median( only median improvement)
2	137+800	Improper median ( only median improvement)
3	139+300	Improper median ( only median improvement)
4	141+800	Improper median ( only median improvement)
5	143+150	Improper median (only median improvement)
6	145+300	Improper median (only median improvement)
7	146+700	Improper median only median improvement)
8	149+700	Improper median (only median improvement)
9	152+000	Improper median (only median improvement)
10	152+500	Improper median (only median improvement)
11	153+200	Median need to close ( Cut on curve)
12	153+700	Improper median only median improvement)
13	155+500	Improper median (only median improvement)
14	156+000	Improper median only median improvement)
15	157+800	Improper median only median improvement)
16	159+500	Improper median (only median improvement)
17	161+000	Improper median (only median improvement)
18	166+300	Median cut need to close
19	168+500	Improper median only median improvement)
20	173+000	Improper median (only median improvement)
21	175+200	Improper median (only median improvement)
22	177+100	Improper median only median improvement)
23	181+800	Improper median only median improvement)

S.No.	Chainage	Problems and Improvement Strategies
24	183+600	Improper median (only median improvement)
25	186+100	Improper median (only median improvement)
26	189+600	Improper median (only median improvement)
27	204+300	Improper median (only median improvement)

Table 116. U-Turn – Median opening

Note:- Closure of U Turn – median opening has been taken up by Authority and will be completed prior to handing over of the stretch to InvIT.

These type of Improper Median Cuts along the Project Stretch should be reconstructed as per IRC:84 by reconstructing the median to ensure the safety of road users. If necessary then proper median cuts should be provided as per IRC 84: 2014.

#### 6.2.5. UNAUTHORIZED RAMPS ALONG THE PROJECT STRETCH

Number of unauthorized ramps was observed along the project stretch at places where the majority of farmers go to their fields and un-paved road have been developed. Most of the unauthorized ramps are leading towards agricultural fields, local residences, roadside restaurants, etc.

Some of the photographs showing Unauthorized Ramps are shown below.



Chainage : 146+400

Chainage : 150+900



Chainage : 166+100

Chainage : 197+400

Figure 116. Photographs of unauthorized ramps



The details related to the locations of such ramps are given in table below in groups of 5 Km length of highway.

S.No.	Chainage		No.	
	From	To	LHS	RHS
1	135+469	140+469	6	6
2	140+469	145+469	4	6
3	145+469	150+469	6	5
4	150+469	155+469	6	4
5	155+469	160+469	8	8
6	160+469	165+469	6	3
7	165+469	170+469	11	10
8	170+469	175+469	9	8
9	175+469	180+469	6	2
10	180+469	185+469	3	6
11	185+469	190+469	1	1
12	190+469	195+469	2	5
13	195+469	200+469	2	3
14	200+469	205+469	5	3
15	205+469	211+000	1	1

Table 117. Number of Unauthorized Ramps

*Note :- All requisites Unauthorized Ramps observed in year 2018 are under implementation at the level of authority and will be completed prior to handing over to InvIT.*

A properly designed T or Y-Junction might be recommended for those ramps which lead to small habitations and groups of agriculture fields where the number and type of vehicles can justify their cost. Also, some of those ramps should be closed if alternatives are identified to access to and from the highway. In any case, no particular works related to this issue will be recommended in this study.

#### 6.2.6. IMPROPER PEDESTRIAN CROSSING ALONG THE PROJECT STRETCH

It is observed that required pedestrian crossing facilities have not been provided and in the absence of these, the local population devise their own unauthorized ways to facilitate crossing the highways affecting the safety of road users and their own safety.

Some of the photographs showing lack of Pedestrian Crossing along the Project Stretch are shown below.



Chainage : 140+900

Chainage : 205+800

Figure 117. Photographs of Improper Pedestrian Crossing along the Project Stretch

According to IRC SP 88-2010 there is a strong necessity and desire for pedestrians to cross the road all along it and suitable provision must be designed to allow for it at appropriate locations with proper pedestrian crossing marking. Controlled form of crossing shall be achieved through provision of Zebra Crossings, whether at signalized intersection or pedestrian actuated signal. When located and used correctly, these can be effective in reducing pedestrian-vehicular traffic conflicts.

S. No.	Chainage	Reason
1	136+200	Median opening ( Improper Pedestrian )
2	139+300	Median opening ( Improper Pedestrian )
3	141+800	Median opening ( Improper Pedestrian )
4	158+800	Median opening ( Improper Pedestrian )
5	163+100	Median opening ( Improper Pedestrian )
6	163+600	Median opening ( Improper Pedestrian )
7	167+500	Median opening ( Improper Pedestrian )
8	170+300	Median opening ( Improper Pedestrian )
9	174+300	Median opening ( Improper Pedestrian )
10	180+100	Median opening ( Improper Pedestrian )

Table 118. Location of Improper Pedestrian Crossing along the Project Stretch

*Note :- All requisites Pedestrian Crossing observed in year 2018 are under implementation at the level of authority and will be completed prior to handing over to InvIT.*

### 6.3. CURRENT SITUATION OF TRUCK LAY-BAYS, BUS BAYS AND BUS STOPS

#### Truck Lay-bays:

The Concessionaire shall construct and maintain adequate number and size of truck lay-bays for parking of trucks by the side of the Project Highway as indicated by the Government. These shall be provided as clause 12.4.2.2 IRC 84:2019.





The following location is purposed for truck lay bay:



Figure 118. Current Situation of layout of Truck lay-bay

S. No.	Chainage		Side	Requirement
	From	To		
1	145+500	-	LHS	Truck lay-bay

Table 119. Proposed location of Truck lay-bay

A typical configuration/layout of Truck Lay bay has been shown in Figure below which is as per provision in IRC SP 84:2019.

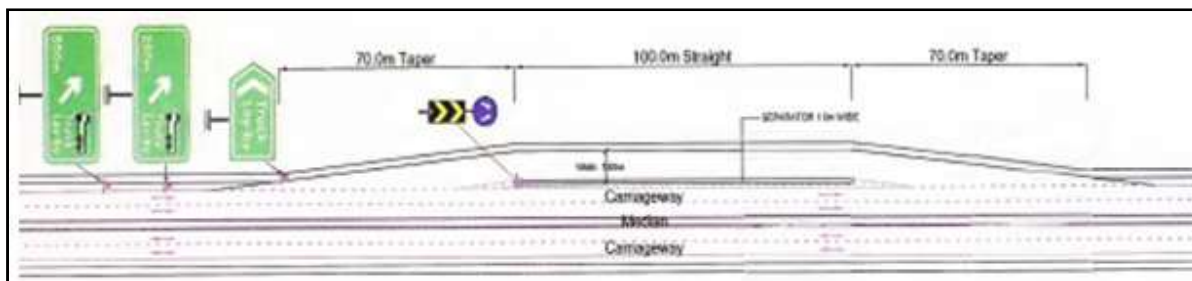


Figure 119. Typical layout of Truck Lay Bay

### **Bus Bays and Bus Shelters:**

Bus bays are required at various locations along project road, mainly where cross roads are meeting with the project road and new habitations have been developed. In four lanes project road there should be Bus Bays on both sides of median as per fig 12.2 of IRC SP 84:2019.

Following photograph present some current situation of bus bay / bus stop along the Project Stretch.





Figure 120. Photograph of location purposed for Bus shelter required (140+400)

The requirements of bus bays and bus shelters have been listed in Table below.

S. No.	Chainage		Side	Requirement
	From	To		
1	140+400	-	RHS	Bus station required (Built up area)

Table 120. Proposed location of Bus-Bay requirement

A typical configuration/layout of Bus Bay is shown below, which follows the provision as per IRC SP 84:2019.

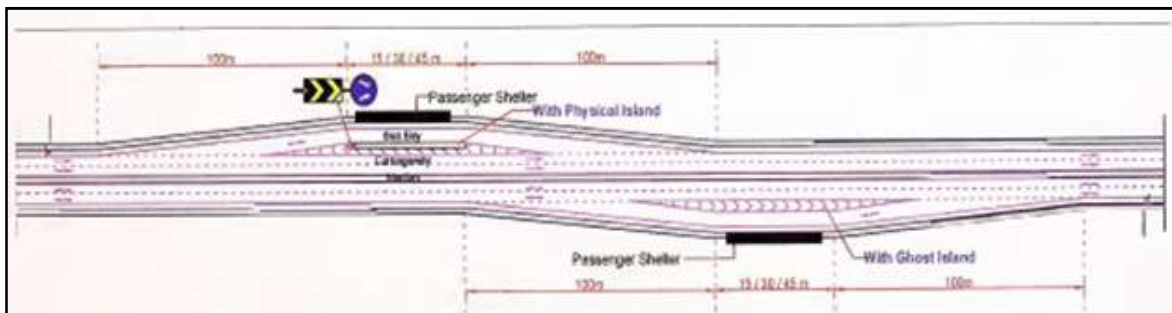


Figure 121. Typical layout of Bus Bay

#### 6.4. JUNCTIONS WITH HIGH TRAFFIC - FLYOVERS

At chainage 165+800 (Gadwal road) it is recommended to build flyovers.

Gadwal road and Stantanpuram are very populated communities that produce a substantial number of vehicle movements that are currently affecting the highway.



The crossing of Gadwal road and the project highway has become a major problem for the safety and serviceability of the project highway. This crossing is located on built-up area that produces a considerable volume of local traffic, the number of vehicles turning and crossing at this junction has reached a level that compromises the safety of all vehicles. Given the characteristics of the area and the layout of service roads, it is recommended to elevate the traffic of the project highway over this crossing building a flyover.

A similar situation can be observed in Stantanpuram which indicates the need to facilitate the movements of traffic on separate grades. Consequently, another flyover of the highway is recommended for this crossing.



Chainage : 165+650



Chainage : 206+500

Figure 122. Photographs of Crossings with high safety risk

The details related to the locations of Recommended Flyovers are given in the following table.

Sr. No	Chainage	Structure	Span (m)	Width (m)	Location
1	165+800	Flyover	1 x 30.0	2 x 15.1	Gadwal road

Table 121. Location of Recommended Flyovers

## 6.5. NEW CONSTRUCTION OF SERVICE ROAD / SLIP ROAD

Details of New Service Road.

S no.	Chainage		Length (m)	Service Road Width (m)	Side
	FROM	TO			
1	135+850	136550	700.00	7	LHS
2	135+850	136550	700.00	7	RHS
3	141+000	141500	500.00	7	LHS
4	143+250	143550	300.00	7	LHS
5	145+000	145250	250.00	7	RHS
6	149+400	150000	600.00	7	RHS
7	150+000	150500	500.00	7	RHS
8	150+850	152650	1800.00	7	LHS
9	152+650	153350	700.00	7	LHS
10	152+650	153350	700.00	7	RHS
11	155+700	156400	700.00	7	LHS
12	155+700	156400	700.00	7	RHS
13	159+000	159350	350.00	7	RHS
14	165+160	165800	640.00	7	LHS
15	165+160	165800	640.00	7	RHS
16	201+650	202+000	350.00	7	LHS
17	201+650	202+000	350.00	7	RHS
18	202+800	202+900	100.00	7	LHS
Total Length			10580.00		

Details of Widening of Service Road

S no.	Chainage		Length (m)	Existing Service Road Width (m)	Proposed Width (m)	Side
	FROM	TO				
1	140+250	140850	600.00	5.5	0+007	RHS
2	146+600	147250	650.00	5.5	0+007	LHS
3	146+600	147250	650.00	5.5	0+007	RHS
4	165+800	166550	750.00	5.5	0+007	LHS
5	165+800	166550	750.00	5.5	0+007	RHS
6	196+800	197900	1100.00	5.5	0+007	RHS
7	196+800	197000	200.00	5.5	0+007	LHS



S no.	Chainage		Length (m)	Existing Service Road Width (m)	Proposed Width (m)	Side
	FROM	TO				
8	205+800	209990	4190.00	5.5	0+007	LHS
9	210+350	210849	499.00	5.5	0+007	LHS
Total length			9389.00			

## 6.6. NEW PROPOSED STRUCTURES

Details of Structures VUP and Minor Bridge new proposed.

S.No	Chainage (km)	Details of Structure			
		Type of structure	Span (m)	Width (m)	Remark
1	136+200	VUP	1 x 12 x 5.5	2 x 15.1	-
2	153+000	VUP	1 x 12 x 5.5	2 x 15.1	-
3	156+050	VUP	1 x 12 x 5.5	2 x 15.1	-
4	202+800	VUP	1 x 12 x 5.5	2 x 15.1	-
5	165+800	Flyover	1 x 30	2 x 15.1	As Per IRC SP 84 2019 Fig. 7.8
6	136+167	MNB	1 x 8.6	2 x 11	Service Road
7	152+795	MNB	2 x 20.6 + 1 x 10.3	2 x 11	Service Road
8	153+280	MNB	1 x 28	2 x 11	Service Road

## 6.7. PROPOSED DRAIN LOCATIONS

Proposed New Drain cum footpath shall be provided as below:

Sl. No.	Chainage (km)		Side	Length (m)	Improvement Proposal	Total Length
	From	To				
1	165160	165+800	BHS	640	Covered Drain cum footpath	1280
2	141000	141+500	LHS	500	Covered Drain cum footpath	500
3	150000	150+500	RHS	500	Covered Drain cum footpath	500
4	159000	159+350	RHS	350	Covered Drain cum footpath	350
5	145000	145+250	RHS	250	Covered Drain cum footpath	250
6	150850	152+650	LHS	1800	Covered Drain cum footpath	1800
7	149400	150+000	RHS	600	Covered Drain cum footpath	600
8	143250	143+550	LHS	300	Covered Drain cum footpath	300
9	135850	136+550	BHS	700	Covered Drain cum footpath	1400



10	152650	153+350	BHS	700	Covered Drain cum footpath	1400
11	155700	156+400	BHS	700	Covered Drain cum footpath	1400
12	202450	202+800	BHS	350	Covered Drain cum footpath	700
13	202800	202+900	LHS	100	Covered Drain cum footpath	100
Total length						10580

## 6.8. PROVISION OF ATMS

The following Specifications and Standards shall be applied in addition to 'Manual on Specifications and Standards for Highways' published as IRC: SP: 99-2013 with all amendments and additions till date. Provision of ATMS in latest NHAI policy in vogue (currently, NHAI Policy Circular-Technical (214/2016) dt.15.09.2016 is being practiced which may be amended in due course of time) will govern the implementation. Latest Policy / Circular at the time of execution shall prevail.

The ATMS implementation shall cover design, supply, installation, commissioning and operation and maintenance of Advanced Traffic Management Systems.

The system would include out-door equipment including variable message sign systems, vehicle detection speed system, close circuit TV camera (CCTV) system. The indoor equipment would comprise a large display board, central computer (with Network Management System – NMS), CCTV monitor system, call centre system or management of emergency call boxes housed in a control centre with uninterrupted power supply. The systems shall meet following objectives:

- Smooth and uninterrupted traffic flow
- Enhance road safety
- Real time information and guidance to users
- Emergency assistance round the clock
- Alerts for abnormal road and weather conditions
- Reduced journey time and inconvenience

The system configuration shall have the following sub-system:

- Variable Message Sign system
- Video Surveillance system
- Video Incident Detection System (VIDS)
- Network /Communication Infrastructure
- ATMS Control Centre

ATMS shall provide the following facilities to Highway users:

- Make emergency calls to Control Centre in case of accidents, breakdown, fire and ambulance.
- Pre-warn the Highway users about unusual condition on the road.

ATMS shall provide the following information/data to traffic managers for efficient and effective handling of traffic:

- Information regarding location of any incident, incoming calls, help required and messages to be passed to third parties.
- Information regarding traffic congestion, speed and weather conditions.

ATMS shall provide the following controls to traffic managers:

- Change the variable message signs from the Control Centre.
- Mobilize the movement of ambulances, cranes & patrolling vehicles.

ATMS shall provide online recording and reviewing of the voice & visual information for record and analysis.





Value Added Systems in information dissemination to users of the Project may be taken up in future. These shall include the following:

- Value Added Systems in the form of real time information on traffic conditions, unusual events, congestion levels, weather conditions etc.; to facilitate project users as also the operator.
- Through relevant websites including that for the Project SPV/Concessionaire.
- Subscription based alert systems.
- Dedicated TV channels pertaining to traffic movement.
- Tie ups with FM radio channels or creation of dedicated AM radio channel.
- Dedicated Toll Free Telephone Systems.

### 6.8.1. VARIABLE MESSAGE SIGNS (VMS)

#### 6.8.1.1. PURPOSE AND GENERAL INFORMATION

Variable Message Signs (VMSs) are to be installed for conveying the traffic conditions ahead to the drivers on real time basis as well as to display messages to support national road safety campaigns. It may also include the variable traffic speed limit depending upon the requirements.

Variable message signs (VMSs) shall provide traveler information for warning, regulating, routing, and managing the traffic in order to improve the overall traffic flow. The philosophy is to inform the driver of impending conditions with up-to-date information. The overall goal of VMS application is to provide permanently located signs that can be programmed remotely to communicate with the drivers the necessary information such that the driver can choose or be directed to the most appropriate route. The VMSs shall be controlled from the main CCR. Based on requirement, the VMS may be fixed or portable in nature.



Figure 123. VMS System

#### 6.8.1.2. LOCATION

VMS shall be provided as per locations determined later. A general policy adopted for locating VMSs is to provide VMS at an average interval of 10 km in each direction (not necessarily on the same gantry) to guide and forewarn the users about the traffic and weather conditions on the Highway.

The most critical locations for installing permanent VMSs are in advance of interchanges or Highways where drivers can have the opportunity to take some action in response to messages displayed on VMSs. A VMS should not compete with existing roadway signs.

Drivers generally do not anticipate using a different route until they see and read a VMS message. Drivers who are traveling in the inside lanes need ample time to read the message and change lanes to exit.

In general, a VMS should be permanently installed at the following locations:

- Upstream from major decision points (e.g., exit ramps, freeway-to-freeway interchanges, or intersection of major routes that will allow drivers to take an alternate route).
- Upstream of bottlenecks, if any
- Where regional information concerning weather conditions such as fog, wind, or dust is essential.

The portable VMS can be mounted at the back of the truck or similar vehicle. The VMS sign mounted on truck could be powered by solar energy or battery.

The exact location shall be adjusted for the maximum utility to the users based on the site conditions, however, only with the consent of the NHAI.

## **6.8.2. VIDEO SURVEILLANCE SYSTEM (CCTV)**

### **6.8.2.1. PURPOSE AND GENERAL INFORMATION**

The purpose of the Video surveillance system is to monitor specific areas of the Highway remotely from the CCR by use of cameras installed at such critical junctions. This shall help in managing incidents.

The system shall also record and store video for analysis and future reference.

The functional and technical requirement of the Closed Circuit Television (CCTV) System to be used as a sub-system of ATMS Implementation shall include fixed cameras and PTZ cameras.

### **6.8.2.2. LOCATION**

The system monitors vehicular and other road related activity along the highway stretch. CCTV system is required to ensure effective surveillance of the target road section and related surrounding areas and generate a tamperproof record for post event analysis.

The software supplied and installed at the ATMS Control Centre to operate the CCTV systems shall be able to integrate with/Export data to and import data from the ATMS unified database located in ATMS Control Centre.

## **6.8.3. VIDEO INCIDENT DETECTION SYSTEM (VIDS)**

### **6.8.3.1. PURPOSE AND GENERAL INFORMATION**

The purpose of the VIDS is to sense, detect and record the incident. The system shall be an intelligent image detection using camera. The VIDS shall have inbuilt intelligence to ascertain when the image has meaningfully deviated from the standard image originally recorded. A pilot run for VIDS is suggested before implementation.

The specification, functional and technical requirement of the CCTV based VIDS to be used as a sub-system of ATMS implementation, for automatic detection of incidents and generation of local visual alerts. It also includes the associated visual alerts in the form of flashing lights which are connected to and activated by the VIDS. The system offered shall have the capability to also operate in low light conditions normally experienced during night. In very poor visibility conditions such as during winter fog/smog, the system shall detect the condition of poor



visibility and generate visual alerts. Further it shall raise an alarm if signal/image quality is too poor to reliably process.

#### **6.8.3.2. LOCATION**

VIDS is established at strategic locations. The software supplied and installed at the ATMS Control Centre to operate the CCTV-based VIDS shall be able to integrate with/Export data to and import data from the ATMS unified database located in ATMS Control Centre.

### **6.8.4. OFC BACKBONE**

#### **6.8.4.1. PURPOSE AND GENERAL INFORMATION**

The purpose of the OFC backbone is to transport voice, data, LAN and video services between the field equipment and CCR.

As the transmission system would be used as a backbone network, the system shall have following characteristics:

- High Availability
- High Reliability
- Dual ring configuration
- Easy to install and operate
- Scalability
- High degree of flexibility with respect to the types of interfaces

#### **6.8.4.2. LOCATION**

OFC shall be laid all through the Highway. It may be laid on RHS or LHS of the main carriageway or in the median. Lateral elements shall be connected on OFC or copper.

### **6.8.5. NETWORK MANAGEMENT SYSTEM (NMS)**

#### **6.8.5.1. PURPOSE AND GENERAL INFORMATION**

This system provides connectivity between ATMS Control Centre and outdoor equipment such as Emergency Roadside Phones, Variable Message Signs, Mobile and fixed CCTV cameras, Speed Displays, ATCC, Mobile Weigh in motion Stations, etc.

It also provides the external data connectivity required between the ATMS control centre and the NHAI ATMS Cloud as well as between the ATMS control centre and the NHAI ATMS Master & relevant Regional Control Centres.

The Fiber Optic Transmission System shall be equipped with a user friendly, Microsoft, Windows-based Network Management System (NMS). The NMS shall allow the operator to manage and monitor multiple sub-networks in an efficient way.

The NMS shall have the following functionality: network configuration, configuration of services, monitoring, diagnostics, activation-deactivation of interface modules, bandwidth allocation, alarms and event logging and graphical network representation.

The network management hardware shall consist of a Personal Computer, which at the time of installation is the current industry standard. The NMS architecture shall be based on Employer-server technology. It shall be

possible to connect multiple active Employers to the NMS server allowing network management from multiple and/or remote locations or by multiple users.

#### **6.8.5.2. LOCATION**

Software at CCR.

### **6.8.6. CENTRAL CONTROL ROOM (CCR)**

#### **6.8.6.1. PURPOSE AND GENERAL INFORMATION**

The purpose of the CCR is to monitor the Highway and to provide information to the road user. The CCR also houses the central servers and data processing equipment.

The CCR shall provide the real-time information and assistance to the Highway users, collect data for the use of Highway authorities and to monitor and control the Traffic on the Highway as per the requirements.

The CCR shall be designed for round the clock operations of monitoring, on-line information acquisition and processing the same for decision making. The CCR shall be the repository of all the data acquired from the field and their processing, storing, and archiving. All the information for real time monitoring oh Highway shall be generated at the CCR and the relevant information shall be disseminated to the users through VMS, and to O&M teams through mobile radio.

ATMS Control Centre would be the facility from where all the activities of the ATMS would be controlled. ATMS Control Centre would primarily comprise of the in-door portion of CCTV, VMS, and other support systems. All the aforementioned subsystems shall preferably reside in a dedicated permanent structure with adequate floor area to house the required man power and equipment. Where ever such a permanent floor/building/structure cannot be made available, the ATMS Control Centre shall be housed in temporary portable cabins.

#### **6.8.6.2. LOCATION**

There shall be one CCR located in any toll plaza.

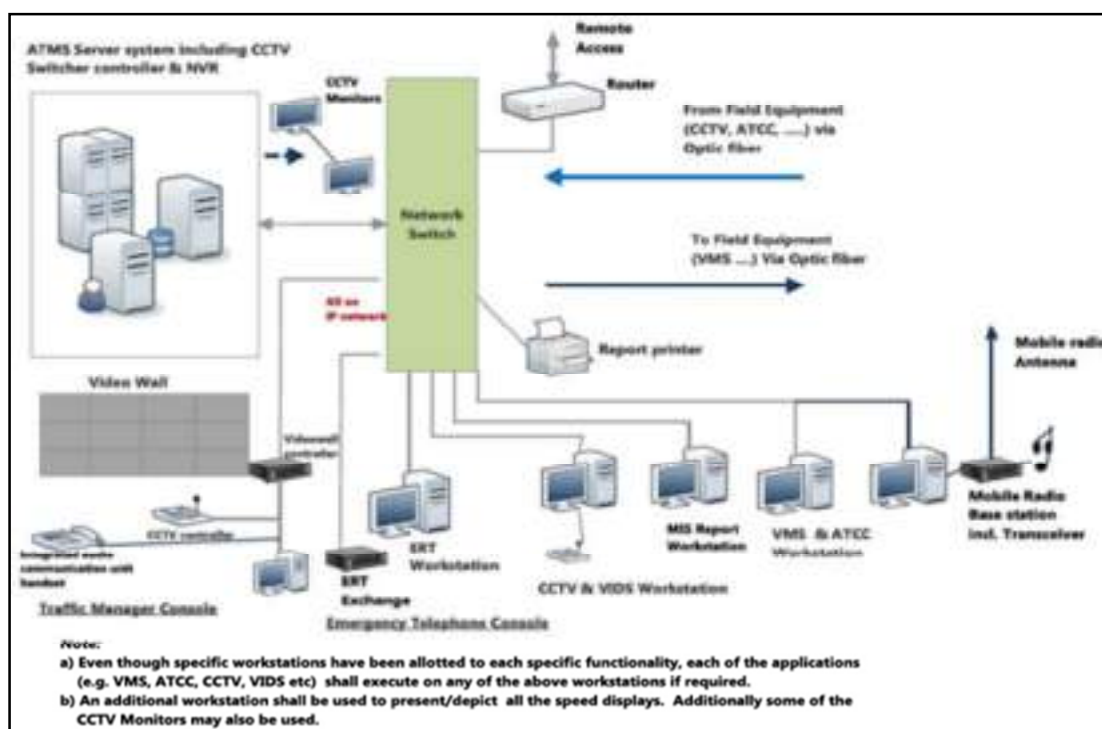


Figure 124. CCR System Schema

### 6.8.7. CONCLUSIONS AND RECOMMENDATIONS

ATMS system should be provided as per its requirement is shown below in the following table:

S.No	Item Description	Unit	Req. Qty	Requirement
1	Video Surveillance system	Nos.	75	<b>Requirement:-</b> To monitor traffic conditions (Day & Night) on the highway including junctions with considerable traffic, populated village town sections / road junctions and vulnerable sections of the highway. Range of 1 km on the highway (i.e. 1 km on either side). <b>Location:-</b> Closed Circuit Television (CCTV) System to be used as a sub-system of ATMS Location of CCTV Cameras shall be within the stretch as verified byNHAI. 1. Built up sections 2. Major Junction 3. Toll Plaza 4. Built up section
2	Video Incident Detection System (VIDS)	Nos.	7	<b>Requirement:-</b> Detection range from Camera location: 200 m (Day and night) Provision of warning with flashing lights: a) 100 m before the area of detection b) 200 m before the area of detection to warn arriving vehicles To be located such that detection range is 200 m or less <b>Location:-</b> Blind corner of highways, highway locations such as vulnerable merger points of Service road with the main carriageway and Junctions. (Location can be finalized in consultation with IE and NHAI at the time of execution).





S.No	Item Description	Unit	Req. Qty	Requirement
3	Network /Communication Infrastructure	Nos.	1	<b>Requirement:-</b> Communications System utilizing Optic fiber, point-to-point wireless links, GSM/GPRS and Wi-Fi Communications linked to ATMS Control Centre shall be provided depending on equipment communication criteria. <b>Location:-</b> At plaza location
4	ATMS Control Centre	Nos.	1	<b>Requirement:-</b> One ATMS Control Centre including the equipment (hardware, software, and local networking) shall be developed on Project Stretch <b>Location:-</b> At plaza location
5	Vehicle Actuated Speed Display	Nos.	6	<b>Requirement:-</b> Detection range from Camera location: 200 m (Day and night) Provision of warning with flashing lights: a) 100 m before the area of detection b) 200 m before the area of detection to warn arriving vehicles To be located such that detection range is 200 m or less <b>Location:-</b> At entry and exit of highway (with VMS) (Location can be finalized in consultation with IE and NHAI at the time of execution).
6	Power supplies for field equipment	Nos.	1	<b>Requirement:-</b> Working on Mains power supported with back-up (largely on renewable energy) to facilitate 24 X 7 operation and for the ATMS Control Centre working on Mains power supported by UPS and Diesel generator set of adequate capacities, to facilitate 24 x 7 operation. <b>Location:-</b> Toll plaza and Stretch portion

Table 122.ATM requirements



## 7. TOLL PLAZA

### 7.1. TOLL SURVEY

Toll on this Project stretch of NH 44 is currently being collected at one location – km 200+950, PullurToll Plaza. This stretch has been constructed under BOT (Annuity) basis with tenure up to 15/09/2026, and toll is being collected by NHAI through open competitive bidding.

The project stretch of this Plaza starts from km 135+469 and ends at km 211+000 with total length of 74.622km.

#### TMS and ETC System

Toll Management System (TMS) is installed.

#### Toll Lanes

There are total 12 operational lanes and presently all are converted to ETC lanes.

TMS application is used to generate toll slip for the customers and weekly & monthly reports.

Equipment like OHLS, UFD and Barrier are present in the lanes and lanes are in working condition.

The booth condition is okay.

Exemption log is maintained by the TC.

Paper smart cards are used and monthly passes are verified by vehicle number.

#### ETC Lanes

There are ten ETC lanes at toll plaza RFID readers are used to detect ETC tags.

AVC - There is AVC at the toll plaza; hence, transactions are validated

#### FASTAG

FASTag is a device that employs Radio Frequency Identification (RFID) technology for making toll payments directly from the prepaid account linked to it. It is affixed on the windscreen of your vehicle and enables you to drive through toll plazas. FASTag has a validity of 5 years and after purchasing it, needs to recharge/ top up the FASTag as per requirement.

FASTag offers near non-stop movement of vehicles through toll plazas and the convenience of cashless payment of toll fee with nation-wide interoperable Electronic Toll Collection Services.

Presently existing toll plaza having 12 ETC dedicated lanes (with RFID) for transitions

### 7.2. CURRENT CONDITION

#### 7.2.1. PULLUR TOLL PLAZA

Existing toll plaza including its infrastructure, toll management system (TMS, if any) and operational activities were reviewed during site visit. Photographs of toll plaza are given below.



Figure 125. Photographs of Pullur Toll Plaza



Figure 126. Aerial photograph of Pullur Toll Plaza

- It is situated at Km 200+950 on NH-44. There is 6+6 tolling lanes including two extra wide lanes at the sides. All lanes are ETC dedicated lanes, five in each direction, with RFID readers and electronically operated boom barriers with synchronized traffic lights.
- Traffic islands and width of Toll Lanes are adequate all as per specification. Traffic islands accommodate toll booths and protective barriers are present as per specification.
- There are 12 Toll booths with adequate space for operator seating, computer, printer and cash box etc. CCTV Cameras are installed.
- Canopy has been provided covering all Toll booths with adequate vertical clearance.
- There is an Administrative Toll Office with control room.
- There is tunnel for the movement between toll office and toll booth of each toll lane.
- For capture the violations of traffic at the toll plaza, Lane camera, AVC are installed at toll lanes for validation of violation.
- Traffic signs, road markings, lighting, firefight system etc. have been provided as per IRC SP-84-2019.
- Commercial operation Date of this stretch was 27/12/2009.
- Fee rules of 2008 are in force and Toll rates are revised on with effect from 01 April 2020.

### 7.2.2. TOLL COLLECTION AND MANAGEMENT SYSTEM

The toll collection shall manual as well as collection with ETC. The system shall include:

- Dedicated ETC lanes with RFID based system
- Manual Collection/Cash collection in mixed lanes and Through RFID in ETC lanes
- Cash Reconciliation module
- Transaction Validation and Audit
- Management Information System (MIS) and Reports
- CCTV Surveillance System on Lanes, Booths, Plaza area
- Real Time connectivity with the Toll plaza office through dedicated and secured internet connection
- Real Time video monitoring display facilities along with network connectivity
- RFID Lane with Automated Vehicle Classification System



- Lane software integrated with all equipment
- Lane system having allowing Toll collectors to Log In and process transactions
- Lane system record and track all transactions shift wise / collector wise
- Lane system store all transactions in Lane controller, independent AVC (iAVC) with inbuilt memory and battery and send all transactions to Plaza server

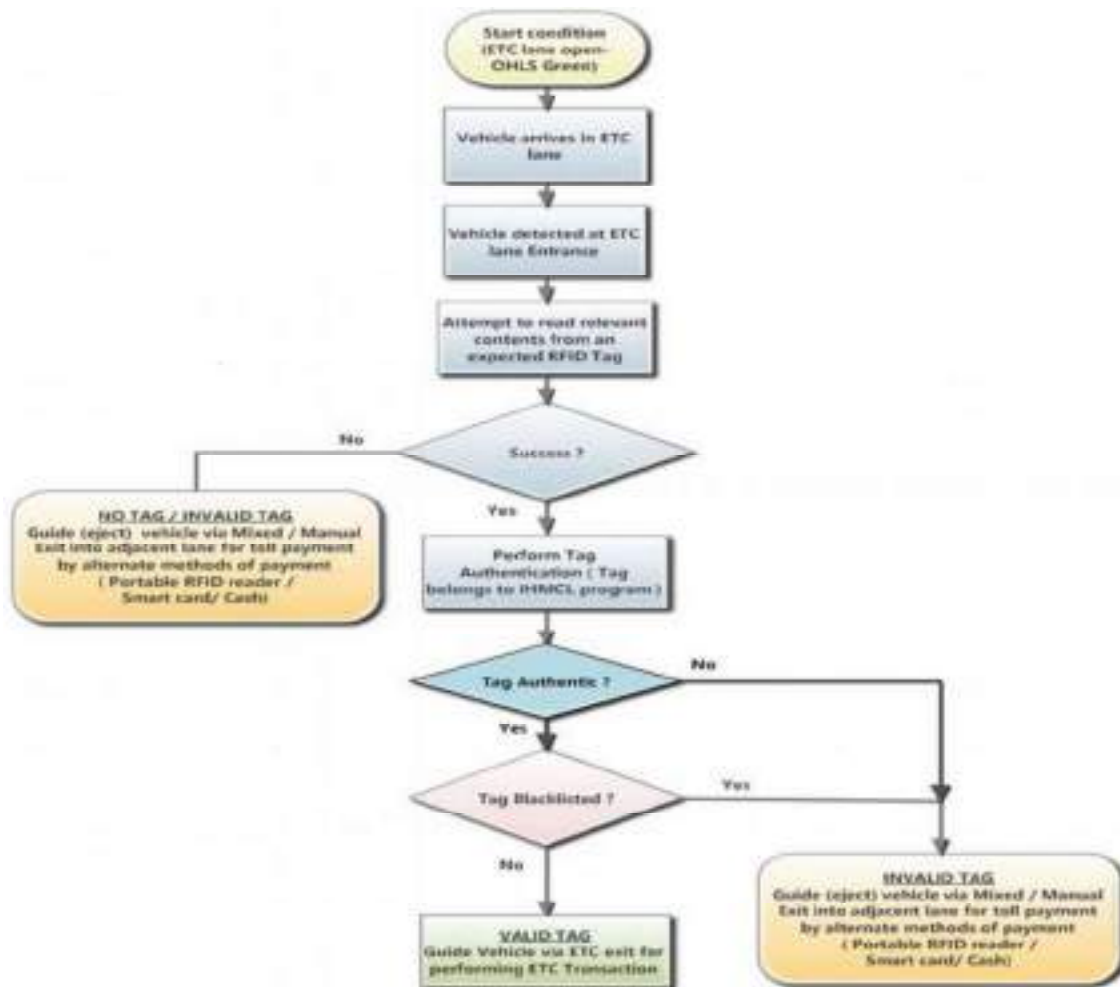


Figure 127. A. Toll Collection System through ETC lane with RFID system

#### Indicative List of Equipment / Software / Licenses

##### a) Plaza and Lane level are Specific Equipment (Common)

- Plaza Server
- Adequate Server Rack, with fans and adequate power points and cable management
- Admin / Audit Workstation – 6 Nos.
- Network Laser Printer (Black & White) - 2
- Network Switches for Lane & Plaza system(s)
- Intercom Slave units
- UPS for plaza system

- Provision of Dedicated Internet connection (minimum 2Mbps link) with Data Center.
- Firewall, IPS etc as per requirement for data security
- PTZ and Dome Cameras

#### b) Software/ Licenses

- Toll Management System with all features fully integrated with all other systems / peripherals.
- Server Operating Systems – Preferably Open Source (Linux / Unix)
- Lane / Admin Workstations Operating System Licenses
- MS-Office on Admin Workstations.
- Relational Data Base Management System (RDBMS)
- Antivirus and Anti-Spam
- Integration with Control Center for Real Time Data & Video Feed Transfer

#### c) Toll Lane Equipment for Hybrid Lane

- Toll Lane Controller with required software/ licenses.
- Readers for prescreening and Tag identification
- Readers for transaction processing
- Independent Automatic Vehicle Classification System (iAVC)
- Lane Software and Licenses
- Transaction Signal / Traffic Light
- Overhead Lane Signal (OHLS)
- Toll Fare Indicator / User Fare Display ix. Automatic Boom Barrier
- Incident Capture Camera xi. Lane and Booth Camera
- License Plate / Automatic Number Plate Reader Camera
- Toll Lane PC / Workstation
- Fog Light
- Violation Light & Violation Alarm
- UPS for Toll Lane Equipment
- Toll Lane Monitor
- Customized Key Board
- Thermal Receipt Printer
- Intercom Slave Unit
- Cash Tray
- Networking & Cabling for data and power
- Data storage, backup and retrieval of entire data being created on the plaza

### 7.3. PROBLEMS

- This toll plaza has ETC system installed in all lanes, but at the time of our survey it has been informed by the Toll Manager that the installed software was not working as per requirement.
- There are no static weigh bridges; and there is weight in motion facilities but they are not in good working condition.
- Toll plaza has not static weigh bridges, and weigh in motion systems are operating below standards. Separate space for holding off loaded goods from overloaded vehicles is not available.



#### 7.4. SEGMENTATION OF VEHICLES ACCORDING TO TYPE OF RATES

Average Traffic Segment Passing through toll plaza for Year-2020 (From Month January to November)	Car, Jeep, VAN OR LMV	LCV, LGV OR Mini Bus	Truck/ Bus (Two Axles)	Three Axle Commercial Vehicle	Hcm Or EME Or MAV (Four To Six Axles)	Oversized Vehicles (Seven Or More Axles)
All types of single Entry	74.26%	84.94%	66.16%	84.05%	82.15%	85.24%
Multiple Entry	1.05%	1.15%	2.26%	0.41%	0.49%	0.08%
Local Vehicle	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Re-usage of Multiple Entry ticket	5.34%	7.46%	9.90%	8.38%	8.17%	7.74%
Re-usage of Monthly Passes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Commercial Vehicles registered in the District	0.05%	0.00%	0.00%	0.00%	0.00%	1.15%
Exempted etc.	19.30%	6.44%	21.68%	7.17%	9.19%	5.79%

Table 123. Segmentation of vehicles according to Type of Rates

Source: Past toll collection data from PIU

#### 7.5. CONSIDERATIONS ABOUT TOLL PLAZA CAPACITY

The number of existing lanes in the toll plaza together with their level of automation allows estimating the service time and thus the capacity of the plaza to manage present and future traffic.

An important parameter to determine traffic capacity of toll plazas is the actual number of vehicles that can be serviced by a particular lane in one hour. According to IRC: SP:84-2019 and for the purpose of guidance, the following capacities are suggested:

- Semi-Automatic lane: 240 vehicles/hour
- ETC dedicated lane: 1200 vehicles/hour (Toll collection through RFID Tags and no stoppage of vehicles)

But the experience indicates that above figures are difficult to meet even when the systems are working at perfection. In fact, drivers and tolling staff behavior and the level of efficiency of the systems at every moment will substantially reduce those figures.

Considering a complete manual process of tolling (that still can be seen at certain plazas and at certain times) up to the most efficient ETC system the following range of capacities could be considered for different scenarios:

- Manual/Semi-automatic lanes: 80 – 130 – 180 – 240 vehicles/hour
- ETC dedicated lanes: 600 – 750 – 900 – 1200 vehicles/hour

In the present study, it was observed that tolling systems in general are operating at a normal level, but in order to stay conservative, the estimations will not consider the maximum number of vehicles from above ranges.

Consideration is also given to current usage of ETC lanes/system at toll plazas as there is not a clear statistic about the number of vehicles that are currently using ETC at each and every toll plaza; however, nationwide estimations arrive to maximum range of ETC usage of 60-75% with FASTAG. Also, it is not well known the impact of hybrid lanes with ETC in the efficiency of toll plazas, and NHAI has recently instructed to convert all normal lanes to the hybrid ETC mode through Radio Frequency Identification Device (RFID). In any case, it is important that the percentages of ETC users increase rapidly with time as it will permit to the existing toll plazas to manage growing traffic more efficiently and without continuous increases of the number of lanes. Authorities are proposing schemes to incentivize the drivers to use ETC, as the one recently taken to mandatorily equip all

new cars with Tag for RFID identification, or the NHAI mandate to install hybrid lanes via letter No. NHAI/13013/CO/Hybrid ETC/Pt on dated 03-10-2018.

In the present study, it is considered that current usage of ETC is 85% and it will be growing at an additional 0.25% for the following years to reach 90 to 95% usage of ETC in 20 years. It should be noted that it is not considered any change/improvement of efficiency due to the conversion of lanes to hybrid mode, which will make the following estimations to be conservative.

Final consideration refers to another recommendation from IRC: SP:84-2019 which states that toll plazas shall be designed for a projected peak hour traffic of 20 years.

PULLUR TOLL PLAZA		2020	2040
AADT (tollable n° vehicles)		21,066	36,439
Peak Hour Factor		5.40%	5.40%
Estimated Peak Hour Traffic (n° vehicles)		1138	1968
Percentage of ETC users		85%	95%
Number of vehicles passing normal lanes per hour		171	98
Number of Vehicles using ETC dedicated lane per hour		967	1,869
N° of ETC lanes required based on capacity (vehicles/hour)	2	3	4
	1	2	3
N° of normal lanes required based on capacity (vehicles/hour)	3	2	2
	1	1	1
	1	1	1

Table 124. Pullur Toll Plaza lanes capacity estimation

According to above table, current number of lanes, 10 ETC dedicated lanes + 2 ETC lanes (total 6+6) is enough to handle current traffic estimated for 2020 provided that the tolling systems work at an adequate level. For year 2040, and considering traffic estimations and a 95% usage of ETC lanes by drivers this plaza will not require any additional expansion, but considering that a high number of users will be using the hybrid lanes with ETC.

## 7.6. RECOMMENDATIONS

- Today, this toll plaza does not require any extra lanes to accommodate current traffic, and also complies with NHAI guidelines, which recommend that the minimum number of toll lanes must be six in each direction. However, it could be convenient to convert the two center lanes (1 + 1) to reversible.
- The Toll Plaza requires an upgrade of its current IT and tolling systems.
- Since overloading of vehicles can be a major problem of road failures it is recommended that weigh in motion systems are revised and renovated as required, and two static weigh bridges to be installed, one in each direction. A separate space for unloading of goods from overloaded vehicles should also be provided.
- Since the existing TMS is old and its liability period is to over at the time of handover of toll plaza to the new concessionaire therefore, fully new system for operation of toll plaza TMS is recommended.



## 7.7. SUMMARY OF IMPROVEMENT PROPOSALS

Immediate investment requirements have been identified for the toll plaza as follows:

- Conversion of the two central lanes (1 + 1) to be reversible.
- Up - gradation of Toll Information Systems (hardware and software), including the ETC and the weigh in motion systems.
- Installation of 2 static weighs bridges.

Bill of Quantities for the above works has been prepared and incorporated in cost estimates. And item consider for TMS for the year 2020 is as following:-

Sr No	Equipment for (12 Lane Plaza)	No. of Lanes as per proposal
1	RFID Lane Reader for Pre-screening and Tag Identification	12
2	Automatic Vehicle Classification (AVC) incl Sensors, loop and detector	12
3	Traffic Light/Transaction Signal	12
4	Overhead Lane Sign	12
5	User Fare Display	12
6	Automatic Boom Barrier	12
7	Barrier IR Sensor	12
8	Fog Light	12
9	Violation Light & Violation Alarm	12
10	Lane Incident Capture Camera	12
11	License Plate Capture Camera	12
12	Loop with Detector	24
13	Light curtain	12
14	Hand held RFID Reader	4
15	Toll Lane Monitor	12
16	Customized Key Board	12
17	Toll Fee Reciept Printer	12
18	UPS for Toll Lane Equipment	12
19	Intercom Slave	12
20	Electronic Enclosure	12
21	Toll Lane Controller	12
22	AVC Controller	12
23	Booth Camera	12
24	Plaza Server	2
25	SAN	1
26	Video Server	1
27	Server Rack	1



Sr No	Equipment for (12 Lane Plaza)	No. of Lanes as per proposal
28	POS Rfid Reader/Writer	1
29	Admin/Audit Workstation	6
30	Network Laser Printer (B&W)	2
31	Network Switch (Layer 2) for Lane and Plaza	2
32	Intercom Master	1
33	UPS for Plaza System	1
34	BarCode Reader	1
35	Internet Connectivity	2
36	Plaza Control Room Display Monitor	1
37	PTZ Camera	2
38	POS/Cashup high resolution Dome camera	4
39	MPLS Connectivity	2
40	Firewall with IPS	1
41	USB Camera for Workstation	6
42	Copier and Scanner	1
43	Wireless Router (2nos. On each side)	2
44	Set of maintenance tools including Laptop computer and other tools	1
45	Oracle database	1
46	MS-Office @ 5000 for 6 Workstations at each site (Reporting Terminal, POS, Validation and Cashup	6
47	Windows Server	2
48	Windows for Workstation	6
49	Anti-Virus and Anti-Spam @ 5000 for 6 Workstations	6
50	Lane Software	12
51	Plaza Software	1
52	IPS - Gateway	1
53	Video Management Software	16



## 8. MATERIAL INVESTIGATIONS

The material investigation has been carried out to identify the potential of construction materials and to assess their general availability and properties. For improvement works, the list of materials includes the following:

- Granular materials for lower sub-base works.
- Crushed stone aggregates for upper sub-base base surfacing and cement concrete works.
- Sand for filter materials and cement concrete works, sub-base and filling material.
- Borrow materials for embankment, sub-grade and filling.

The information on material sources was carried out with the following basic objectives.

- Location of sources indicating chainage and location (place).
- Access to source, indicating the direction i.e. left/right of Project Stretch, approximate lead distance from the Project Stretch and type of access road.
- The quality of material along with its test results and classification in details.

During the process of investigation, due consideration has been given to the locally available materials for reducing the cost of construction. The samples from various identified sources have been collected for laboratory testing as per IRC/MORT&H 5th Revision Specifications/BIS standards.

### 8.1. BORROW AREA SOILS

The potentials borrow area location for sub-grade and embankment construction has been identified. Tests were performed on the samples collected from these Borrow areas for their suitability to be used in the construction of sub-grade.

The required laboratory testing was conducted as in Table below.

S.No	Type of sample	Sampling criteria	TestingCriteria	
			Description of Test	Std code Applicable
1	Borrow Area Soil	Representative samples of various borrow area soils were collected within the reasonable lead distance	Soil Classification	IS 1498
			Sieve Analysis	IS 2720 (Part-IV)
			Atterberg Limits	IS 2720 (Part-V)
			Laboratory Compaction test	IS 2720 (Part –VIII)
			4-days soaked CBR test	IS 2720 (Part-XVI)
2	Coarse aggregate	Representative samples of various sizes of stone	Specific Gravity and Water Absorption	IS 2386 (Part-III)
3	Crushers / Quarries	Including stone dust were collected from quarries	Description of Test	Std code Application
			Aggregate impact values (AIV) Test	IS 2386 (Part-IV)
			Stripping and coating value Test	IS 6241
			Los Angeles Abrasion Value (LAV) Test	IS 2386 (Part-IV)
			Combined Flakiness and Elongation index Test	IS 2386 (Part-I)

Table 125. Site Sampling and Testing Criteria



Borrow areas soils available near the project stretch fulfill the requirement to be used for construction and all the values are within the acceptable limits as per MoRT&H 5<sup>th</sup> Revision Specifications.

## 8.2. COARSE AGGREGATE (STONE)

Coarse aggregate samples were collected from the nearby available quarries and the required laboratory tests were carried out on the collected samples. The summary of the test results are tabulated below. The physical requirement of coarse aggregates to be adopted in road construction is also tabulated below for all pavement layers as per MoRT&H 5<sup>th</sup> Revision Specifications.

S.No	Name of Stone Quarry Area	Lead Distance up to Project road	Location Direction of Crusher
1	Nasirpur crusher site	4 km away from Kothakota	4 km away from right side of km 135+000
2	Nasirpur quarry	10 km away from crusher site	14 km away from right side of km 135+000
3	Ulindakonda quarry	2 km away from km 230+000 on NH-7	2 km away from left/right side of km 230+000 on NH-7

Table 126.Details showing stone source and lead

AQ. No.	Source/Location	Specific Gravity	Water Absorption (%)	AIV (%)	Coating values (%)	Soundness Test (%)
1	Nasirpur crusher	2.82	0.18	25	>95%	3
2	Nasirpur quarry	2.81	0.17	26.5	>95%	2.5
3	Ulindakonda quarry left side	2.86	0.28	22	>95%	2.2
4	Ulindakonda quarry right side	2.84	0.33	22	>95%	2.0

Table 127. Test Results summary of Course Aggregate (stone)

S.No	Test	GSB	WMM	Pavement Layer		
				BM	DBM	BC
1	Water Absorption	2% (max)*	2% (max)	2% (max)	2% (max)	2% (max)
2	Los Angeles Abrasion Value	-	40% (max)	40% (max)	35% (max)	30% (max)
3	Aggregate Impact Value	40% (max)	30% (max)	30% (max)	27% (max)	24% (max)
4	Combined Flakiness and Elongation Index	-	35% (max)	35% (max)	35% (max)	35% (max)
5	Striping/ Coating	-	-	95% (min)	95% (min)	95% (min)
*If Water absorption value is more than 2, the aggregate is to be tested for soundness test						

Table 128.MoRTH 5th Revision Specifications for Coarse Aggregate in road construction

- Aggregate Impact Value (AIV), Los Angeles Abrasion Value (LAV) and Combined Flakiness and Elongations Index Value are within the limit as per MoRT&H 5<sup>th</sup> Revision Specifications to be used in granular layers and in surface layers of BC/DBM for both the sources AQ-1 and AQ-2.
- Water absorption is within the specified limit.

### 8.3. LEAD CHART

Following Figure shows the lead chart for the Borrow Area, Aggregate Quarry and Sand Quarry of the Project Stretch.

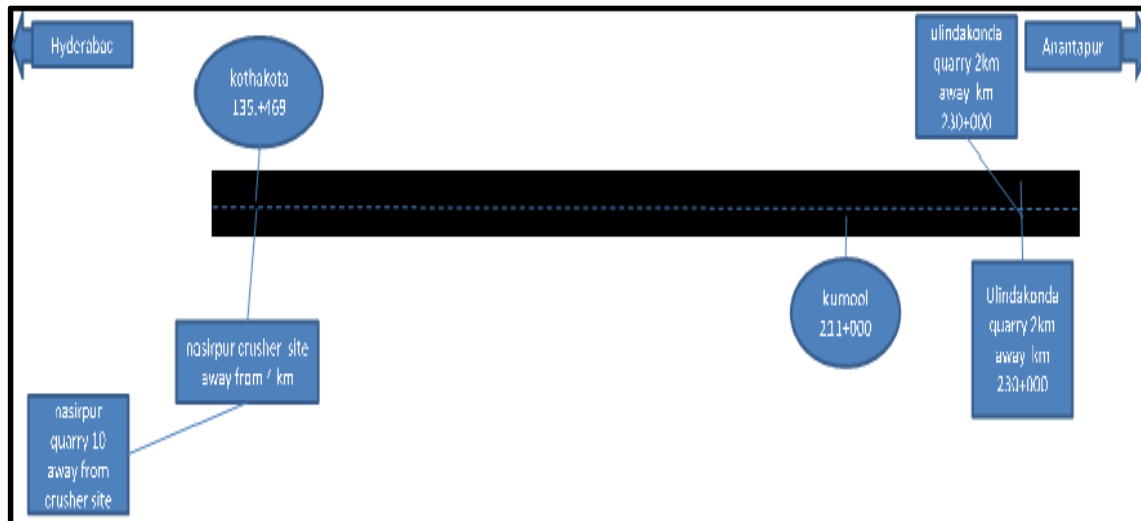


Figure 128. Lead Chart





## 9. COST ESTIMATE

### 9.1. GENERAL

The Project cost estimates have been prepared based on various items of works required such as:

- Intersections improvements
- Service Roads/Service Lane
- New proposed structures (VUP/LVUP/Flyover/Other Structures)
- Bus bays & Truck Lay Bays
- Miscellaneous Items
- Widening of Culverts
- ATMS& TMS

Provision of granular sub base and WMM base courses has been considered for the service roads, Truck lay bays, Bus bays and Toll plaza. Provision of 'bituminous courses', has been considered of DBM and Bituminous Concrete for service roads, Overlaying in carriageway, pavement for Truck Terminals, Bus bays and provision of Cement Concrete pavement for Toll plaza lanes. Repair and Rehabilitations of existing culverts, bridges & other structures is also proposed base on the NDT Tests and Inventory of the structures.

### 9.2. ESTIMATION OF QUANTITIES

The quantities of major items of works have been worked out based on following:

- Site Clearance: The area considered for Site Clearance is the area within the proposed Right of Way.
- Earth Works: This item provides for roadway excavation, earthwork in embankment, sub-grade and shoulders, medians, islands including disposal of surplus earth and unsuitable material. In this stage, the construction of embankment height has been taken as per site condition. Sub-grade soil having a CBR  $\leq 12\%$  will be taken from borrows area. It is also to be ensured that during construction the existing 500mm thick embankment/existing ground below the sub-grade is re-compacted to MDD and have CBR value  $\leq 12\%$
- The pavement quantities like GSB, WMM & Bituminous items etc. have been worked out based on Typical Cross Sections, pavement design is done based on traffic and with 10% CBR.
- The estimation of quantities for Repair & Rehabilitation is based on NDT Tests and site conditions of structures and has been worked out as per site requirement in order to maintain durability of structures and natural drainage system of project area.
- Traffic Signs and Markings: Proposed as per site requirement and the quantities have been calculated as per Design Plan and IRC standard.
- The quantities for junctions, bus bays, traffic appurtenances and other miscellaneous items have been calculated from the standard drawings.
- Based on typical cross section estimates of new construction for service road/slip roads has been prepared.
- A study of the existing structures has been carried out to ascertain the structure to be retained or reconstructed. Cost of the Repairs, Rehabilitation, and up-gradation of stretches are worked out by experienced bridge engineers.

### 9.3. PROJECT COST

Cost estimate was made for the following proposal suggested.

1. The pavement quantities like GSB, WMM & Bituminous items etc. have been worked out based on Typical Cross Sections, pavement design for Service roads/slip roads, Truck lay bays/bus bays done based on minimum requirement of traffic MSA.
2. Proposed Base and Sub-Base and surface Courses for Service road/service lanes.

Sub-grade	GSB	WMM	DBM	BC
500 mm	200 mm	250 mm	60 mm	40 mm

Table 129. Proposed Base and Sub-Base and surface Courses for Service road/service lanes

3. Proposed Base and Sub-Base and surface Courses for Bus bays & Truck lay bays.

Sub-grade	GSB	WMM	DBM	BC
500 mm	200 mm	250 mm	80 mm	40 mm

Table 130. Proposed Base and Sub-Base and surface Courses for Bus bays & Truck lay bays

## 9.4. IMPROVEMENT PROPOSALS

Following improvement proposals have been considered based on site requirement and Road Safety Chapter.

### 9.4.1. NEW PROPOSED TRUCK LAY BAYS

Sr. No	Chainage	Side
1	145+500	LHS

Table 131. New Proposed Truck Lay Bays

### 9.4.2. NEW SAFETY BARRIERS

Safety barrier is provided in accordance with RSA.

- Length of safety barrier in LHS: 3,680 m.
- Length of safety barrier in RHS: 4,280 m.
- Total length of safety barrier: 7,960 m.

### 9.4.3. SOLAR BLINKER (NEW)

Solar blinkers are provided in accordance with RSA at Junctions, Toll plaza, Bus bays/Truck lay bays.

- Total of solar blinkers provided: 342 nos.

### 9.4.4. SERVICE ROAD

New Service road and Widening of existing service roads is provided in accordance with RSA.

New Proposed Service/Slip roads.

S no.	Chainage		Length (m)	Service Road Width (m)	Side
	FROM	TO			
1	135+850	136550	700.00	7	LHS
2	135+850	136550	700.00	7	RHS
3	141+000	141500	500.00	7	LHS
4	143+250	143550	300.00	7	LHS
5	145+000	145250	250.00	7	RHS
6	149+400	150000	600.00	7	RHS
7	150+000	150500	500.00	7	RHS
8	150+850	152650	1800.00	7	LHS



S no.	Chainage		Length (m)	Service Road Width (m)	Side
	FROM	TO			
9	152+650	153350	700.00	7	LHS
10	152+650	153350	700.00	7	RHS
11	155+700	156400	700.00	7	LHS
12	155+700	156400	700.00	7	RHS
13	159+000	159350	350.00	7	RHS
14	165+160	165800	640.00	7	LHS
15	165+160	165800	640.00	7	RHS
16	201+650	202+000	350.00	7	LHS
17	201+650	202+000	350.00	7	RHS
18	202+800	202900	100.00	7	LHS
Total Length			10580.00		

Table 132. New proposed Service road

Widening of existing Service/Slip roads

S no.	Chainage		Length (m)	Existing Service Road Width (m)	Proposed Width (m)	Side
	FROM	TO				
1	140+250	140850	600.00	5.5	0+007	RHS
2	146+600	147250	650.00	5.5	0+007	LHS
3	146+600	147250	650.00	5.5	0+007	RHS
4	165+800	166550	750.00	5.5	0+007	LHS
5	165+800	166550	750.00	5.5	0+007	RHS
6	196+800	197900	1100.00	5.5	0+007	RHS
7	196+800	197000	200.00	5.5	0+007	LHS
8	205+800	209990	4190.00	5.5	0+007	LHS
9	210+350	210849	499.00	5.5	0+007	LHS
Total length			9389.00			

Table 133 A. Widening of Service road

#### 9.4.5. JUNCTIONS IMPROVEMENTS

Quantities of Junction improvements such as Acceleration & De-Acceleration lane and junction flaring are determined from standard drawings and in accordance with RSA.

- No. of Acceleration lanes: 24nos.
- No. of De-Accelerationlanes: 24nos.
- No. of junction flaring: 0 nos.

#### 9.4.6. NEW PROPOSED STRUCTURES (VUP/Flyover/Minor Bridges)

S.No	Chainage (km)	Details of Structure			
		Type of	Span (m)	Width (m)	Remark

		structure			
1	136+200	VUP	1 x 12 x 5.5	2 x 15.1	-
2	153+000	VUP	1 x 12 x 5.5	2 x 15.1	-
3	156+050	VUP	1 x 12 x 5.5	2 x 15.1	-
4	202+800	VUP	1 x 12 x 5.5	2 x 15.1	-
5	165+800	Flyover	1 x 30	2 x 15.1	As Per IRC SP 84 2019 Fig. 7.8
6	136+167	MNB	1 x 8.6	2 x 11	Service Road
7	152+795	MNB	2 x 20.6 + 1 x 10.3	2 x 11	Service Road
8	153+280	MNB	1 x 28	2 x 11	Service Road

Table 1345. New Proposed Structures

#### 9.4.7. Widening of Structures (Box/Pipe)

Widening is proposed for structure to extension and widening of service roads

S.No	Chainage (km)	Details of existing culvert		Improvement Proposal		
		Type of structure	Span (m)	Type	Span (m)	Width (m)
1	136.263	Box Culvert	2 x 3 x 2	Box	2 x 3 x 2	2 x 11
2	136.420	Box Culvert	2x3x3	Box	2x3x3	2 x 11
3	136.947	Box Culvert	1x2.5x2.5	Box	1x2.5x2.5	2 x 11
4	153.060	Box Culvert	1x1.5x1.5	Box	1x1.5x1.5	2 x 11
5	165.526	Box Culvert	1x1x1.2	Box	1x1x1.2	2 x 11
6	141.000	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11
7	143.269	Pipe Culvert	2x1.20	Pipe	2x1.20	2 x 11
8	145.227	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11
9	150.238	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11
10	152.760	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11
11	152.930	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11



S.No	Chainage (km)	Details of existing culvert		Improvement Proposal		
		Type of structure	Span (m)	Type	Span (m)	Width (m)
12	153.148	Pipe Culvert	2x1.00	Pipe	2x1.00	2 x 11
13	165.331	Pipe Culvert	1x1.00	Pipe	1x1.00	2 x 11

## 9.5. METHODOLOGY

In this report estimation of preliminary cost, a primary pre-requisite for financial evaluation, has been carried out. The process involved in the preliminary cost estimation has been described under the following sections.

### 9.5.1. RATE ANALYSIS

To develop a thorough understanding of the prevailing construction rates the Consultant reviewed the following:

- Rate Analysis for project stretch is worked out as per MORT&H standard data book. The obtained rates have been considered for cost estimates. Following the review, it was noted that the similar items either are not available in SOR or have been considered as per prevailing industry rates.
- The basic rate of major items has been assessed from prevailing industry rates (Bitumen rates taken from Chennai Refinery of IOCL, Cement Rates taken from Chennai market and Stone Aggregate rates are taken from Stone quarry at Quarry Road in Chennai Bypass).

Then, rate analysis has been carried out strictly in accordance with the procedure described in the latest "Standard Data Book for Analysis of Rates" of MORT&H fifth revision. The basic rates have been adjusted considering the lead for each contract package separately. Rate analysis has been carried out for each item of structures including those for rehabilitation works according to the Standard Data Book of MORT&H fifth revision.

Cost Estimates have been escalated @5% for every year for the consecutive year 2020. Whatever cost shown here will be considered as the base year 2020.

The rates so derived are compared with the rates for corresponding items for the other recent on-going projects.

### 9.5.2. COST ABSTRACT

Abstract of estimated initial costs for the Project Stretch is given below.

Initial Cost for Engineering and Safety Improvements for Base year 2020:

Kothakota Bypass – Kurnool Section (from km 135+469to km 211+000) of NH-44 in the State of Telangana			
ABSTRACT			
Sr no.	Particulars	Amount in Rs.	Amount in Crores
1	Toll Plaza	15400000	1.54
1	Intersections Improvements	98899154	9.89
2	Miscellaneous Items	200577692	20.06
3	Service Roads/Service Lanes	429063293	42.91
4	Bus/ Truck Lay Bays	8086786	0.81
5	New Proposed Structures with RE wall and Approaches	925509513	92.55



Kothakota Bypass – Kurnool Section (from km 135+469to km 211+000) of NH-44 in the State of Telangana)			
ABSTRACT			
Sr no.	Particulars	Amount in Rs.	Amount in Crores
6	Culverts	15447971	1.54
7	ATMS & TMS	201625391	20.16
	Total	1894609800	189.46
	Add GST @ 12 % on total cost	227353176	22.74
	Sub Total	2121962976	212.20
	Contingency @ 5%	106098149	10.61
	Total Amount =	2228061125	222.81

Table 1356. Abstract of estimated initial costs

#### Operation and Maintenance Cost for Base year 2020-2021:

The Project Operation and Maintenance cost estimates have been prepared based on various circulars and analysis:

- Routine Maintenance for BT works at MCW consider as @ 7lacs/km/year for 2010-2011 (add escalation @5% per year from 2010-2011 to 2020-2021  $7 \times 1.05^{10} = 11.40$  lacs/km/year) circular NHAI/11033/CGM(Fin)/2011
- Routine Maintenance for BT works at Service/Slip roads consider as 60% of @ 7lacs/km/year for 2010-2011
- Equipment Based Survey Works (Annual/Periodic as per Maintenance Schedule) based on market rate
- Contingency @ 3 %
- Toll Plaza operation and maintenance charges @ 32.5 lacs/lane/year
- System Integrator maintenance charges @ 5.04 lacs/lane/year
- Electricity & Patrolling expenses @ 2.03 lacs/km/year
- Additional RPV( Route patrolling vehicle) for state police department and Ambulance services for state government health authority to be provided
- The ATMS systems shall cover design, supply, installation, commissioning and operation and maintenance including charges for electricity to be provided
- SPV charges or Other Office expenses @ 407 lacs/year
- Insurance cost
- And GST @ 12% on all above item has been added in total Operation and Maintenance cost

#### FOR PERIODIC MAINTENANCE WORKS:

- Periodic maintenance works for main carriageway and service road is proposed as per MoRT&H circular (RW/NH-33044/10/2022-S&R dated 21-August-2018)
- Periodic renewal is proposed at every 6<sup>th</sup> year after completion of existing annuity period i.e 2026. For Main carriageway 40mm BC and for Service/Slip roads/bus bays/ truck lay bay/junction etc. 30mm BC is proposed for every successive renewal period.

Total Operation and Maintenance cost for (30 Years)	
Particular	Str-4
Routine Maintenance	233.55



Total Operation and Maintenance cost for (30 Years)	
Toll Plaza Operation and Maintenance	164.88
Electricity & Patrolling expenses	87.58
Other office expenses	150.67
Insurance	64.75
GST @ 12%	84.17
Total Routine Maintenance cost	785.60
<b>Major Maintenance :- (Cycles)</b>	
<b>2029-2030</b>	<b>83.16</b>
<b>2042-2043</b>	<b>104.47</b>
<b>2048-2049</b>	<b>108.59</b>
<b>Construction Period (2036-2038) DLP Period 5 years (2038-2043)</b>	

Table 137. Abstract of Operation and Maintenance costs

All cost are mentioned in this report are based on year 2020. Also the cost for Major Maintenance Work would be escalated for their consecutive appearance years on the basis of Price index.

Capacity Augmentation Cost: Based on Year 2020:

Kothakota Bypass – Kurnool Section (from km 135+469to km 211+000) of NH-44 in the State of Telangana)			
ABSTRACT			
Sr no.	Particulars	Amount in Rs.	Amount in Cr.
1	Bituminous Courses	1244172972	124.42
2	Clearing and Grubbing	158007704	15.80
3	Widening of Road 4 Lane to 6 Lane	2816662479	281.67
4	Widening of Structure 4 Lane to 6 Lane	993815200	99.38
5	Repair & Rehabilitation of Existing Structures.	54023198	5.40
6	Intersections Improvements	260583732	26.06
7	Miscellaneous Items (including Road Furniture)	857919123	85.79
8	Service Roads	609186333	60.92
9	RE Wall / Structure Approach	109379132	10.94
10	Bus/ Truck Lay Bays	181292024	18.13
11	Drain	254111836	25.41
12	Landscaping and Tree Plantation	53201148	5.32
13	ATMS / TMS	346629472	34.66
	<b>Total</b>	<b>7938984355</b>	<b>793.90</b>

Table 138. Abstract of costs Capacity Augmentation





## 10. COMPLEMENTARY DATA

### 10.1. TOPOGRAPHIC SURVEY

#### 10.1.1. MOBILE LIDAR TECHNOLOGY

##### 10.1.1.1. INTRODUCTION

The basic objective of the topographic survey would be to capture the essential ground features along the alignment in order to consider improvements and for working out improvements and rehabilitation costs. The detailed topographic surveys should normally be taken up after the completion of reconnaissance surveys.

The following are the set of deliverables which should be submitted after completion of survey:

- Raw DGPS data for the entire highway length and adjoining areas of interest
- Point cloud data/Data of points captured for the entire highway length and adjoining areas of interest
- Topographic map of scale 1:1000 of the entire highway length and adjoining areas of interest
- Contour map of 50 cm of entire highway length and adjoining areas of interest
- Cross section of the highway at every 100 m in \*.dwg format.

For land based surveys, Network Survey Vehicle/ Mobile LiDAR (Light Detection and Ranging) shall be adopted.

The detailed field surveys would essentially include the following activities:

- Topographic Surveys along the Existing Right of Way (ROW): Carrying out topographic survey using LiDAR or equivalent technology along the existing road, wherever required and properly referencing the same with reference pillars fixed on either side of the centre-line at safe places within the ROW.
- Collection/ Extraction of details for all features such as structures (bridges, culverts etc.) utilities, existing roads, electric and telephone installations (both O/H as well as underground), huts, buildings, fencing and trees (with girth greater than 0.3 metre) oil and gas lines etc. falling within the extent of survey.

The width of the survey corridor should take into account the layout of the existing alignment including the extent of embankment and cut slopes and the general ground profile. While carrying out the field surveys, the topographic surveys should cover sufficient width beyond the centre line of the carriageway. Normally the surveys should extend a minimum of 30 m beyond either side of the centre line of the carriageway or land boundary whichever is more.

##### 10.1.1.2. LIDAR TECHNOLOGY OVERVIEW

LiDAR (Light Detection and Ranging) is a new survey technique which has the advantage of collecting the survey data at very high rate and getting a 3D point cloud of the area being mapped. It has wide ranging applications in 3D mapping, robotics, autonomous vehicles, infrastructure planning and monitoring, mining etc. This document briefly reviews the methodology and steps to be conducted for LiDAR Survey.

##### 10.1.1.3. WORKS METHODOLOGY

In addition to LiDAR data, most highway projects in India also require establishing Primary Ground Control Points. GPS is used to establish primary control points at an interval of approximately 5 km.

The data collected using these is processed and checked for errors if they are within acceptable limits. The error is adjusted so that it does not propagate in the long route. These control points also serve as check points to assess the accuracy of LiDAR data.



The data collected on the site have to be processed in order to get the accurate georeferenced coordinates by combining various data obtained through LiDAR, IMU and GPS sensors. There no standard software for this. Every LiDAR manufacturer creates its own software for creating the point cloud. The result is a dense point cloud. This point cloud is adjusted with TBMs to get best accuracy levels.

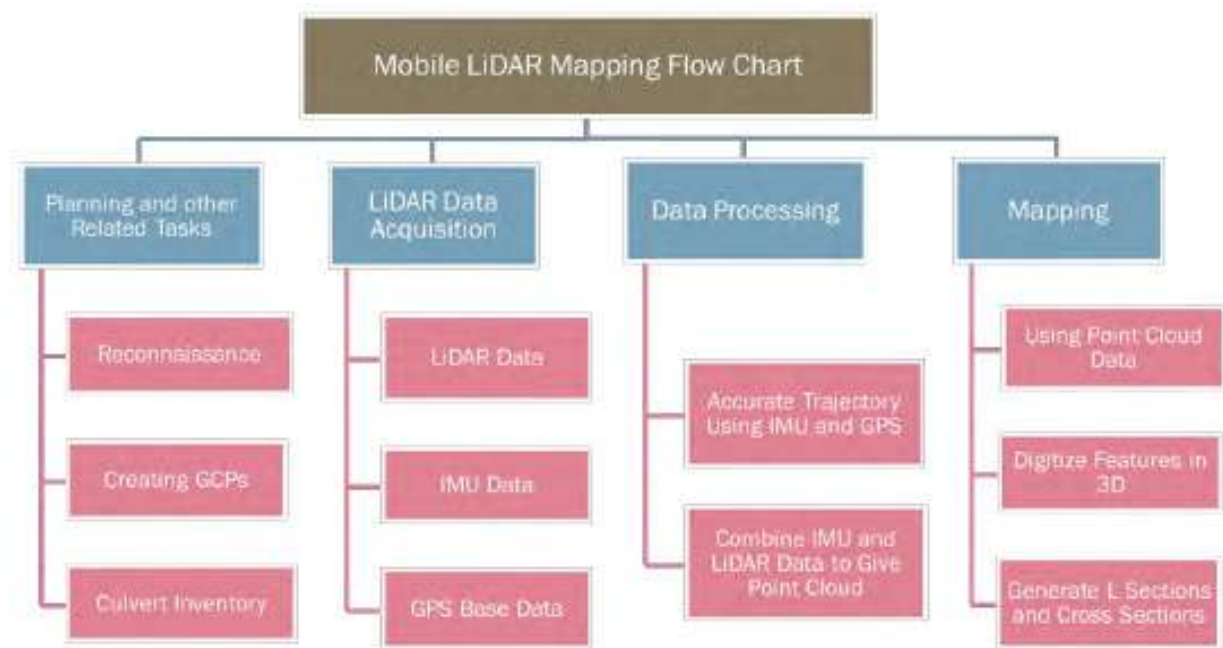


Figure 129. Mobile LiDAR mapping Flow Chart

#### 10.1.1.4. EQUIPMENT

In this kind of survey, the LiDAR equipment is mounted on top of a vehicle along with Inertial Measurement Unit (IMU) and GPS. The data is collected on the go and generally about 100 KM of data can be collected in a day depending upon the terrain conditions.

There are two major components of a mobile LiDAR scanner: LiDAR and Inertial Measurement Unit (IMU). A standard picture of the mobile scanner is given in Fig 1; IMU further consist of Inertial Navigation System (INS) and GNSS receivers. GNSS provides location of the sensor on the surface of the earth using signals from satellites.





Figure 130. Equipment

Depending upon the quality of the GNSS receiver (single or dual frequency), the location accuracy can vary from 2 cm to a few meter even under visible sky.

More than often, road survey projects involve surveying through dense canopy of trees. Here a standalone GNSS systems performs poorly due to limited visibility of the satellites. Here, Inertial Navigation System, consisting of Gyroscopes and accelerometers, enables users to get quality location data. Standard software like Inertial Explorer from Novatel is used to fuse GNSS data with inertial data.

In addition to these equipment, a static GPS is also placed on a fixed control point within suitable range of the survey area to provide more accuracy when processed with vehicle mounted GPS data. This technique is called differential-GNSS. To ensure better accuracy, GNSS data is collected in good sky visibility during the LiDAR survey work. This data is then used to correct the error in the positioning.

Laser scanner used in the LiDAR system also varies quite a lot. Major differentiating factors are range and measurements per second. Industry standards are Z+F, Riegl, Velodyne, Quanergy etc. All of these have a line of sight range of 100m or more. Scanning speeds range from 500,000 points per second to 1,000,000 per second. All of these sensors are better than 1 cm at 100 m range.

#### 10.1.1.5. DATA COLLECTION AND ANALYSIS OF DATA

Mobile mapping is the process of collecting geospatial data from a mobile vehicle. Typically fitted with a LiDAR remote sensing systems, such systems are composed of an integrated array of time synchronized navigation sensors (survey grade DGPS) and imaging sensors mounted on a mobile platform. Primary output after pre-processing of data includes geo-referenced 3D point cloud data, digital maps, images and videos. Further, after postprocessing, output in desired format like AutoCAD\*.dwg or Arc GIS\*.shp files are obtained.

After the LiDAR data is processed, it is used to classify features. All the desired features are identified and classified using standard software such as Bentley Micro-station. A topographic map alongwith contours can be provided in CAD format. L section and cross sections can also be generated using LiDAR data as required by the client.

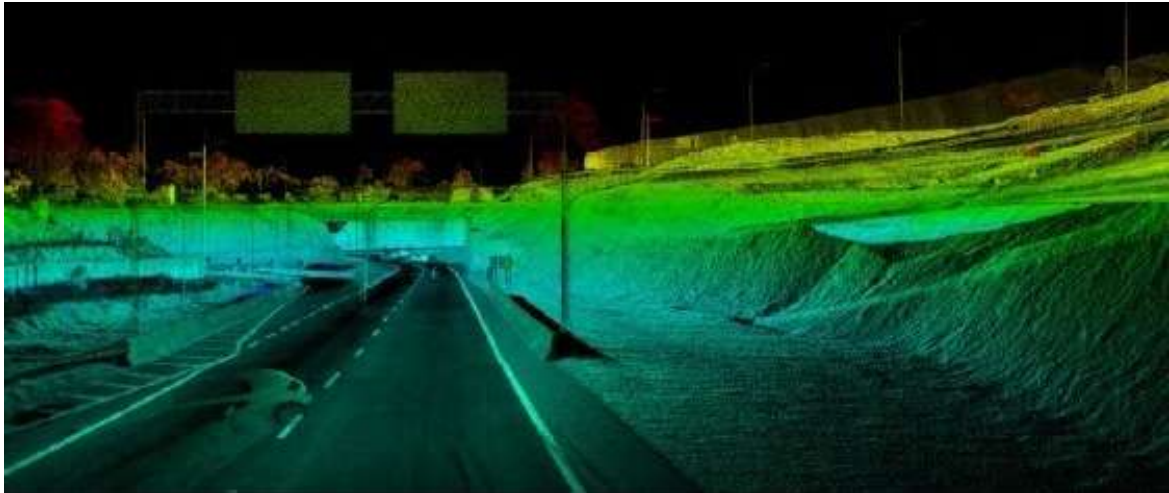


Figure 131. LiDAR point cloud sample – colors by height

#### 10.1.1.6. GENERAL DELIVERIES

- Detailed Topographical Map of total ROW minimum 60m, i.e. 30 m on either side of the road centerline with standard feature mapping
- Cross Section at every 10 m along the centerline and L-section every 10 m in AutoCAD format.
- Contour map at 50 cm contour interval.  
360 degree panoramic images of the entire highway length and adjoining areas of interest shall be submitted.
- 3D drawings in CAD format with lines features as 3D polyline.

#### 10.1.2. AERIAL DRONE VIDEOGRAPHY

It has been carried out a High Definition video captured by drone as per ToR requirements. The work flow to be followed has been:



Figure 132. Flow chart drone

##### 10.1.2.1. SITE ASSESSMENT

The Drone Agency will undertake a preliminary site assessment in each stretch to understand the environment where have to operate its drone. The objectives of the site-visit are to:

- Understand the topography, weather conditions, and general environment in which the land-survey needs to be undertaken.
- Know obstructions and hazards posed by natural, or man-made structures for drones to fly in the survey area.
- Plan for contingency measures to deal with the hazards.
- Gather inputs for detailed flight planning of the drone taking into consideration the topography, weather conditions, general environment, obstructions, and hazards.
- Determine the logistical needs, and time-frame required for conducting the video recording in the roads.
- Plan the project execution from start to finish accurately so as to meet the customer's timeframe without delays
- Collect the X-Y/Lat-Long co-ordinates of start and end points, ascertain whether additional inputs or work is required to be done.



Figure 133. Sample of Software of Flight Planification

#### 10.1.2.2. DRONE FLIGHT PLANNING

Drone Agency will make use of the detailed requirements defined by ToR, along with the information gathered from the site assessment to create the drone flight plan. The flight plan defines how, when, and where the drone will fly and what data will be gathered by the drone in the process of surveying the land.

#### 10.1.2.3. DATA COLLECTION AND TRANSFER

On site operations will involve data collection on board the drone. Transfer of data for presentation and analysis will be done as and when data connectivity is available to the onsite team.

#### 10.1.2.4. DATA PROCESSING AND DELIVERY

The data collected by the drone will be processed to generate the HD Video as per ToR. Each road will be delivered in a separated file and a sheet of data of the flight and road recorded. This sheet will includes: drone characteristics (controlling unit, processing unit ...), camera used (Lents ...), GPS (if any), planning software, processing software and height of flight.



#### **ANNEXURES– A (SURVEY YEAR 2018)**

- ▣ ANNEXURE 1 NSV EQUIPMENT
- ▣ ANNEXURE 2 PAVEMENT MATERIAL INVESTIGATION
- ▣ ANNEXURE 3 LABORATORY INVESTIGATION
- ▣ ANNEXURE 4 DEFLECTIONS
- ▣ ANNEXURE 5 IRI AND RUT RESULTS
- ▣ ANNEXURE 6 HDM-4 RESULTS
- ▣ ANNEXURE 7 AAHSTO-HDM CALCULATIONS RESULTS
- ▣ ANNEXURE 8 STRUCTURES
- ▣ ANNEXURE 9 NDT RESULTS
- ▣ ANNEXURE 10 TRAFFIC PROJECTIONS
- ▣ ANNEXURE 11 MAJOR MINOR JUNCTIONS
- ▣ ANNEXURE 12 STRIP PLAN AND KILOMETRIC REFERENCE
- ▣ ANNEXURE 13 (A) REGULATORY ASPECTS
- ▣ ANNEXURE 13 (B) PERMITS AND APPROVALS

#### **ANNEXURES – B (DATA PROVIDED BY AUTHORITY)**

#### **ANNEXURES – C TRAFFIC DATA & COST ESTIMATES (YEAR 2020)**

- ▣ ANNEXURE 1 TRAFFIC PROJECTIONS
- ▣ ANNEXURE 2 OPERATION AND MAINTANANCE COST
- ▣ ANNEXURE 3 INITIAL IMPROVEMENT COST





■ QUALITY CONTROL SHEET

<b>DOCUMENT</b>	Technical Due Diligence Report of NH44 (NH7) –Stretch of Kothakota Bypass – Kurnool Highway					
<b>PROJECT</b>	Preparation of report on physical condition of the national highways on roads under (the National Highways Infra Trust)					
<b>CODE</b>	IM4663-FR-STRETCH_7-Ed1(Annexures)					
<b>AUTHOR</b>	INITIALS	RFS				
	DATE	2/07/2018				
<b>VERIFIED</b>	INITIALS	GAA				
	DATE	2/07/2018				
<b>RECIPIENT</b>	National Highways Authority of India					
<b>NOTES</b>						
<b>TECHNICAL CONSULTANT</b>	Tecnica Y Proyectos, S.A (TYPSA) In JV with AVANZA Engineering Pvt. Ltd. D-75 VASHALI NAGAR JAIPUR (RAJ.), 302021 TEL NO. – 0141 - 4022513					



## ANNEXURES

- ▣ ANNEXURE 1 NSV EQUIPMENT
- ▣ ANNEXURE 2 PAVEMENT MATERIAL INVESTIGATION
- ▣ ANNEXURE 3 LABORATORY INVESTIGATION
- ▣ ANNEXURE 4 DEFLECTIONS
- ▣ ANNEXURE 5 IRI AND RUT RESULTS
- ▣ ANNEXURE 6 HDM-4 RESULTS
- ▣ ANNEXURE 7 AAHSTO-HDM CALCULATIONS RESULTS
- ▣ ANNEXURE 8 STRUCTURES
- ▣ ANNEXURE 9 NDT RESULTS
- ▣ ANNEXURE 10 TRAFFIC PROJECTIONS
- ▣ ANNEXURE 11 MAJOR MINOR JUNCTIONS
- ▣ ANNEXURE 12 STRIP PLAN & KILOMETRIC REFERENCE

## ANNEXURE 1 NSV EQUIPMENT

## 1. NSV DATA

It has been operated a NSV equipment, which has collected at the same time Inventory, Cracking, IRI, Rutting and Geometry (Slope, Cross slope and Radius of curvature) data, including corresponding images (front and pavement).

### COMPONENTS OF THE SYSTEM

#### EXTERIOR GPS VISION SYSTEM

The GPS Vision system consists of a high grade Differential Global Positioning System (DGPS), Rocket grade Inertial Measurement Unit (IMU), sub centimeter Distance Measuring Instrument (DMI), six 1600 x 1200 optical cameras mounted in stereo pairs viewing forward front, left and right, a house front camera, two optical to infrared downward pavement facing cameras. Two sets of line lasers mounted behind the rear wheels projecting to rear of vehicle and point lasers in the wheel path projecting down and several computers and mass storage devices and user interface system.



Figure 1 GPS vision system



Figure 2 GPS vision system components

The high resolution stereo cameras are mounted within their in secure, climate controlled and waterproof pods and the pods are affixed to the roof rack. Wider camera positions are possible outside the width of the interior of the survey vehicle providing a longer base distance between the stereo pairs which adds to the exceptional accuracy of the GPS Vision system. The roof rack is permanently marked for consistent alignment without the risk of bumping or interference that can occur with cameras mounted inside the vehicle. Positioning the cameras on top of the vehicle also creates an excellent viewing height to see both the roadway in front of the vehicle and see over adjacent vehicles. In addition the same perspective is maintained throughout the project without the image and accuracy degradation that can occur from viewing through curved, tempered and possibly tinted auto windshield glass. As stated previously the standard GPS Vision system consists of 1600x1200 optical cameras mounted in a stereo pair forward front, two optical infrared downward pavement facing cameras.

Images will be collected at a camera (CCD) resolution of 1600x 1200 pixels (approximately 2 megapixels) as captured and in 3D point of view essentially doubles those megapixel resolutions as an overlapped or interlaced view.

### INTERIOR GPS VISION SYSTEM

The GPS Vision Systems TM is integrated with GPS/INS solutions for accurate positioning of mobile mapping data. The integrated GPS/INS solution produces continuous, smooth position and orientation of the GPS Vision™ data. The system has the capability to provide accurate positional data for several minutes even when the GPS signals are lost due to obstructions such as bridges, trees, tunnels or high-rise buildings.

The GPS Vision Distance Measure Instrument (DMI) is integrated with the GPS/INS system and used to provide distance pulses and velocity to the various data collection modules. Information from the DMI is used in one of two methods; the first is for distanced based data where data is collected at a set distance intervals and the second for time based systems that require the distance or speed information associated with the data captured at the defined time interval. The DMI consists of an encoder tracking

revolution of the vehicle tire. The DMI is very accurate meeting the requirements of ASTM E-950, 0.02% of the distance traveled, and California Test Method 1001-S, 1 foot in 528 feet. The images below represent examples of typical vehicle equipment configurations.



Figure 3 NSV Control Systems and Data Storage

#### GPS VISION LASERSCAN™

The GPS Vision LaserScan™ system consists of:

- Downward facing Point lasers - for a wheel path IRI assessment of the road surface.
- Downward facing infrared cameras - for a hi-resolution view of the road lane surface profile. The images area combined to give a 4m wide continuous pavement view. This is used both for crack detection and cross lane profiling.
- Line projecting lasers –Through the LaserScan™ software, pavement rutting and cross profiles are automatically measured to sub-centimeter accuracy.
- Laser gauges – these are mounted in the wheel path and take >1kHz measurements of the road surface to <0.05mm resolution. This allows us to exceed ASTM E950 recommendations for a class 1 longitudinal profiler for a wheel path at up to highway speeds.
- 4-axis accelerometers – these are mounted directly above each laser gauge. They provide an inertial basis for the LaserScan™ system.

GPS Vision™ Imaging system integration – the LaserScan™ system incorporates measurements from the wheel counters, GPS, and INS and imaging systems on the vehicle to provide precise distance and location readings for developing a complete 3D model of the roadway.

#### DISTANCE MEASUREMENT INDICATOR (DMI)

A Distance Measurement Indicator (DMI) is used to aid in the GPS/INS positioning solution and used to measure the distance (log mile) and trigger image sets at a predetermined image distance. GPS Vision system uses a proprietary Kalman algorithm that calibrates the DMI automatically in post processing. Our DMI is typically configured for 4000 counts per wheel revolution or less than 1 mm accuracy. The DMI needs to be checked and calibrated prior to each project and the system checks that the spacing is meeting the required length automatically with each image to keep the image distance correct. In a similar



procedure the GPS satellites and inertial measurements are automatically checked and validated and any out of bounds readings turn red to the operator.

Camera lens calibration includes and internal software adjustment to account for lens distortions. The initial calibration of the lens to the camera and the cameras to one another is part of the overall system design and quality control and is performed when a system is commissioned. The camera settings are generated by the program parameters at the end of a system build and checked at the start of every survey or every 3 months whichever is sooner. Periodic calibration checks may be performed during defined routine maintenance inspections. Therefore, standard field procedures do not require adjustment of the physical equipment.

### BASE STATION

We generally use a base station for our surveys to maintain better data reliability. A base station antenna is set in an open area, so that the GPS data is as complete and accurate as possible. If surveying for multiple days within a certain area, the antenna is located in the same position each day, thereby assuring consistency of the local GPS data.

### FEATURES OF GPS VISION SYSTEM

The components of GPS Vision System contribute to the following features:

- The external hardware is interfaced with a central data logger unit which stores the collected location, image and laser data for transfer to processing software. This systems is integrated with Inertial Navigation System (having pitch and roll accuracy of <0.4 degrees, Acceleration Input Range  $\pm 4$  g or  $\pm 10$  g), a differentially corrected Global Positioning system (GPS) and a Distance Measuring Instrument (DMI) for highly accurate vehicle positioning.
- Laser profilometers utilizes a class I profiler to collect roughness measurements in the form of the International Roughness Index (IRI). This system utilizes data from point lasers and accelerometers to output IRI at most posted speeds.
- Transverse profile of the pavement surface is generated based on the actual rut depth when compared to the pavement surface level outside the wheel path. The central data logger captures the transvers profile data for decoding into the profile and rutting measurements of the roadway.
- Rutting profile of the pavement surface is generated using two line laser mounted at each wheel path and two thermal cameras mounted at the roof of the vehicle over each wheel path laser enclosure to capture full lane rutting profile. The system can detect the overall rut profile and the maximum depth even with the vehicle deviating slightly from the wheel path.
- Cross Profile Straight Edge is used for quality control checks of the Transverse profile. GPS Vision uses this method to calibrate the continuous cross profile and can provide the transvers profile view in the image at each summary reading at multiple locations during an actual project.
- 3D profiles of the road are provided by stereo pair cameras which will be similar to the view that is required by the Pavement Condition Index (PCI) survey methodology. The images provide measurements of not only any cracks or pavement distresses but also the location and vital measurements of any right of way object that is in the image view.
- Pavement right of way image logs are captured which are geometrically correct to quickly locate and measure any roadway feature and extract that data for further plotting on maps or to populate databases. The Stereo pair images are very similar to how the operator sees the world and it is intuitive to use to capture road right of way information user friendly way to virtual visit the roadway and make measurements from the computer which is beneficial than only viewing the video based images.



- Road geometry measurement is done using built-in high resolution Inertial Navigation System to calculate the radius of curvature, cross-fall and etc.
- A GPS system with a  $\pm 1\text{cm}+2\text{ppm}$  Horizontal accuracy and  $\pm 2\text{cm}+2\text{ppm}$  Vertical accuracy of the vehicle location is utilized. GPS Vision is also integrated with a GPS Base Station to provide differential correction to the rover unit. The GPS is tightly integrated with the inertial navigation system and distance measuring system using the Kalman filter to calculate the position. When the proper numbers of satellites are not available this system is able to operate on the INS for up to 5 minutes.
- Inventory and rating for pavement condition and right of way asset data are done using manual visual input through the keyboard. The number of keys available to the vehicle system operator is programmable.
- Calibration for roughness meter is done using on known pavement sections where the profile ground truth is measured with a ASTM Class 1 and World Bank Standard Class 1 profiler. This reference pavement profile and the mobile IRI point laser are compared. Adjustments to the point laser are made to better correlate with the test section.
- The system has a built-in Distance Measuring Instrument (DMI) with less than 1 mm accuracy. The DMI is tightly integrated with the GPS and INS through a Kalman filter.
- The data acquisition software has a spatial data viewing feature to plan the survey and monitor the cameras and lasers during the survey. Feature logger includes image processing options which are used to define the attributes of the roadways collected and apply changes in brightness, color saturation to the real-time captured images for optimum viewing. The software stores the location data and images in a structured way based on the planned survey routes.
- GPS Vision System has desktop based software for extracting distresses and road right of way features (in the form of spatial features - point, line and polygon) and their related attribute data from the stereo-pair images captured during the survey. The extracted spatial features and their attributes are easily exportable in GIS format and any standardized RDBMS format.

#### PAVEMENT CONDITION AND RIGHT OF WAY DATA COLLECTION

The data collection process will involve following activities to ensure collection of accurate and quality data during the survey

- Field data collection personnel preparedness: The driving routine plan will be provided to the dedicated personnel for optimal viewing and consistent pattern driving on the roadway. The maps and support materials are check and verified
- Field data collection equipment preparation: Prior to field data collection, the GPS Vision system will be set up for optimum viewing and data collection efficiency based on data collection features desired. This calibration camera setting will be tested the day before safe operation and that all equipment is well maintained and in working order.
- Data collection procedure: During data collection, one driver and one navigator will operate the GPS Vision system following the project and safety procedures. The procedure will capture high resolution stereo-pair images to record the road distresses and right of way features. The point and line laser assembly along with high-end infrared cameras will record the transverse and longitudinal profile of the road for roughness, rutting and etc. One of the critical procedures is the automated image quality tools that provide a “dashboard” view of the actual images during the field survey. These are monitored during the entire data collection schedule. The broadcast GPS locations and rates will check for operation and monitored throughout the drive. Our staff will also establish and setup GPS base stations throughout the project according to the established drive pattern in pre-

designated open areas established by the project manager. The use of both of these correction procedures is critical for the most accurate differentially correct data.

Highlights of the data collection process:

- The GPS Vision system will collect imagery per lane in both directions.
- The images will be captured at a user defined interval along the roadway. This will ensure that all features along the roadway will have good coverage and can be extracted accurately from images. This is especially important for roads with two or three lanes in one driving directions.
- High-resolution (1380x1024, 1600x1200 possible) cameras will be used to capture detailed images of the roadways.
- At the end of each data collection day, digital image data will be reviewed for quality, GPS data is checked for sufficient coverage from the base station and data is processed to check the completeness.
- Before the data collection is finished, all data will be compared with the required highways to make sure all required roads have valid data.
- The data will be combined and edited to clean overlaps or extra sections. The roadway information will be attached to image point data. Digital images will be reorganized based on their roadway attribute, like name.
- The attributed image point data will then serve as the database for web-based viewer software and can be accessed as driving down a specified street from its beginning to its end.
- Images will be included in ICARO RMS.
- Field data collection QC: At the end of each day, collected data are processed and images are reviewed. The processed data will be compared with the planned road to see if any road is missing.

#### FEATURE EXTRACTION PROCESS METHODOLOGY

The images collected by GPS Vision system are used to obtain International Roughness Index (IRI), Pavement Condition Index (PCI) and other asset data of the road. These images organized based on the survey planned will be used in desktop based feature extraction software for extracting road distresses and right of way features and its attributes and storing them in industry standard RDBMS.

#### ROAD DISTRESS FEATURE EXTRACTION

The distresses on the roads will be identified and captured in a virtual environment through viewing of stereo-pair high resolution images.



Figure 4 Snapshot of feature extraction software window



Figure 5 Snapshot of feature extraction software window



Figure 6. Snapshot of feature extraction of pot holes





Figure 7. Snapshot of feature extraction of pot holes



Figure 8. Snapshot of feature extraction of pot holes



Figure 9. Snapshot of feature extraction of cracking



Figure 10. Snapshot of feature extraction of cracking



Figure 11. Snapshot of feature extraction of cracking



Figure 12. Snapshot of feature extraction of wide cracking





Figure 13. Snapshot of feature extraction of wide cracking



Figure 14. Snapshot of feature extraction of wide cracking

The images of the pavement captured are used to identify sample units. Multiple sample units are marked along the road and each sample unit are recorded with road distresses based on the surface type i.e., Asphalt, PCC and etc.



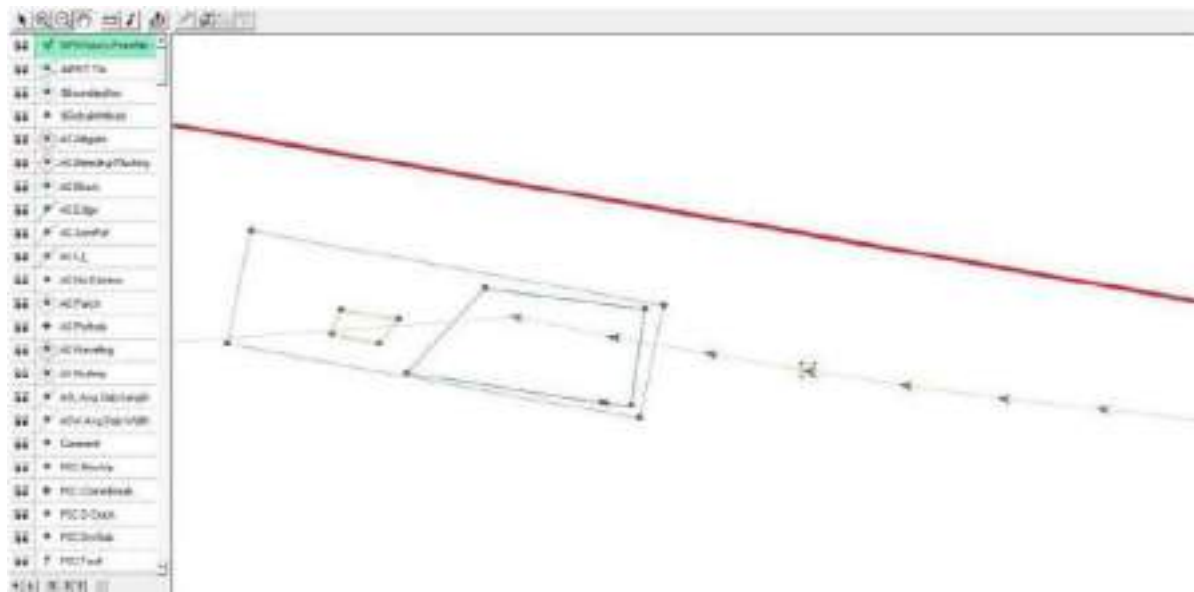


Figure 15 Window showing simple unit

The type and severity of pavement distress is assessed by visualizing the processed digital image in the feature extraction software and then marking the distresses in the sample unit.

The distress data are used to calculate the PCI for each sample unit using ASTM methodology. The PCI of the pavement section is determined based on the PCI of the inspected sample units within the section.

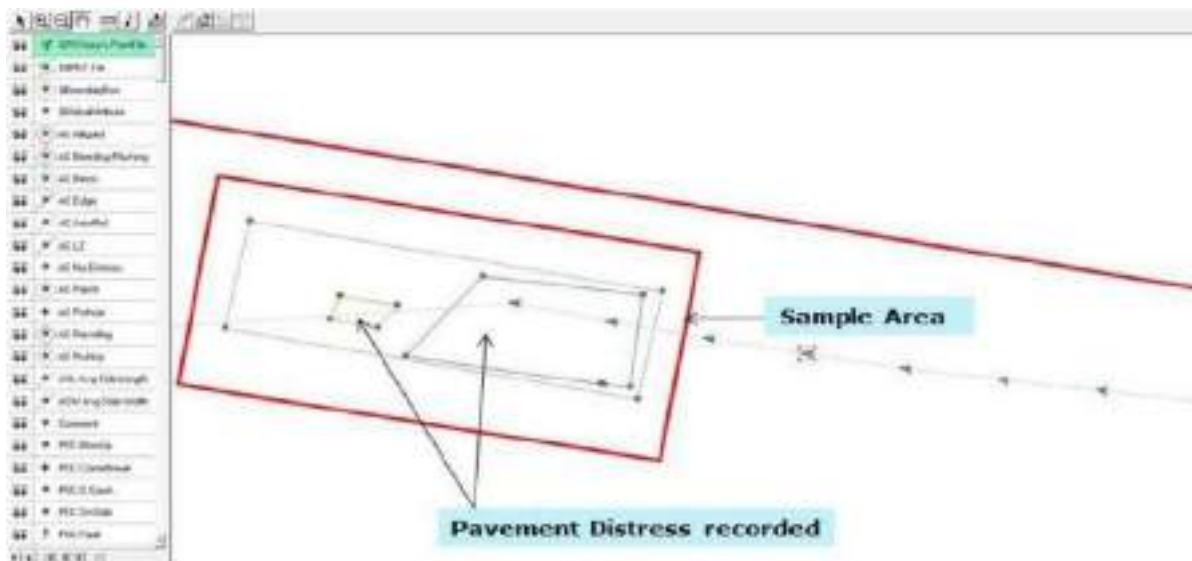


Figure 16 Snapshot showing captured simple units and recorded distresses

The data obtained from Lasers along the transverse and longitudinal profiles will be used to generate IRI and rutting.

The PCI and IRI rating for the roads will be done based on the required standards of road condition.

## ROAD RIGHT OF WAY FEATURE EXTRACTION

As in the road distress feature extraction process stereo pair images will be used in feature extraction software to extract right of way inventory.

As shown below, any element that is identified from the images can be extracted within the software. Additionally, when the element is located a record table is associated with each feature location which allows the user to populate the attribute database on the fly. Feature extraction will be done by simply clicking on the image itself to capture all relevant GIS, GPS and attribute data. Each feature could be assigned a separate symbol based on its type.

This process of inventory is repeated for all items on the inventory list that can be developed for the client. A final list of features to be inventoried and positioned along the right of way can be discussed and finalized with the client.

After the feature extraction process is completed, the output files including centerlines and related inventory feature data can be formatted to match specifications in a number of GIS and CAD systems.

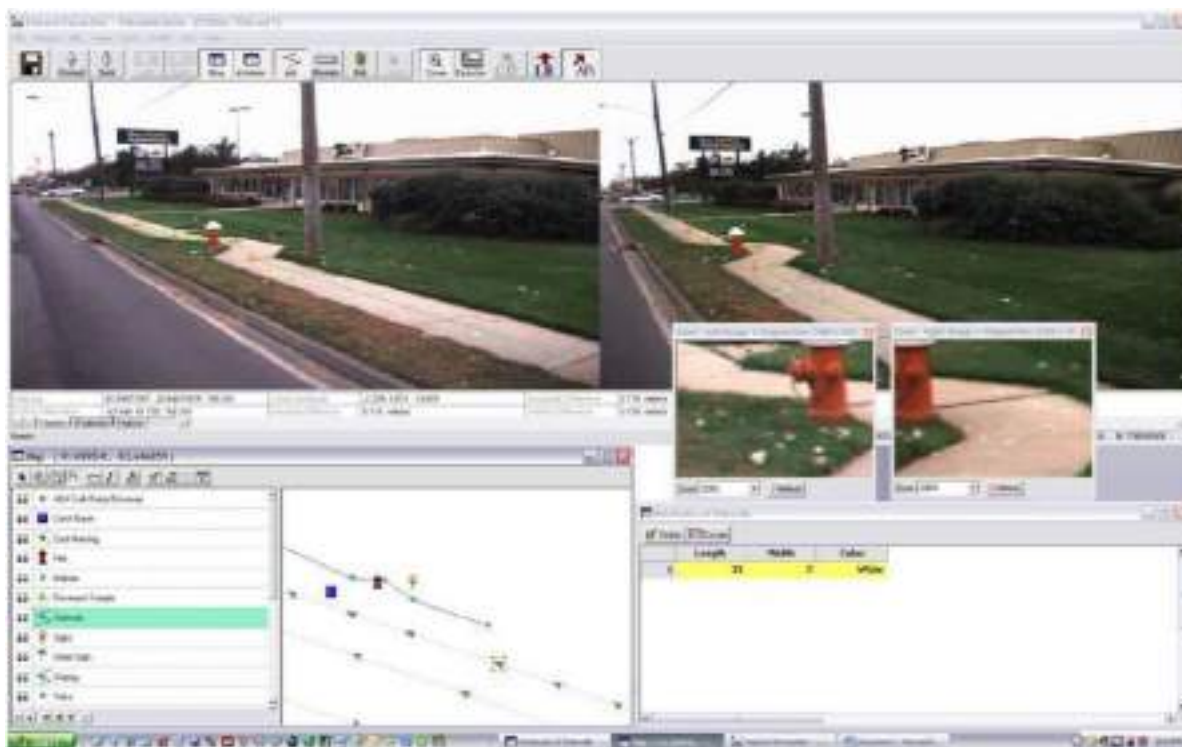


Figure 18 Snapshot showing extraction of Right of Way features

### TYPE OF FEATURES EXTRACTED

The Feature Extraction software captures various types of features which are broadly categorized into road distresses and road right of way features.

### FOR PAVEMENT CONDITION

The feature extraction software extracts pavement condition data such as distress features, its quantity and severity based on the surface type i.e., asphalt or PCC. The distress list for each surface type is as per the IRC or per ASTM defined distresses for each of the surface types, according to NHAI requirements.

### FOR PAVEMENT RIGHT OF WAY

The extraction of pavement right-of-way data can be for the following, but not limited to, asset and its sub-types. The software can extract any right of way asset visible in the images based on the following.

- Affected service
- Bypass
- Carriageway
- Culvert (asset inventory included in further section)
- Delineator post
- Embankment
- Flyover
- Fuel station

- Guard post
- Guide post
- Hectometer stone
- High mast lights
- Junction
- Kilometre stone
- Land use
- Line drain
- Longitudinal road marking
- Major bridge (asset inventory included in further section)
- Median opening
- Median
- Minor Bridge (asset inventory included in further section)
- Pedestrian cattle underpass
- Pedestrian guardrail
- Punctual road marking
- Retaining structure
- Right of way
- Roadside arboriculture
- Safety barrier
- Shoulder
- Sign
- Slip-Service road
- Solar blinker
- Street light
- Toilet block
- Toll plaza
- Truck lay bye
- Urban section
- Vehicular underpass
- Village town
- Water body
- Way side amenity

The minimum aspects to be collected from each asset are as follows:

- Road
- Section (LHS / RHS)
- Kilometric Point (initial and final)
- Latitude and Longitude
- Date
- Margin (LEFT / RIGHT / BOTH (LEFT AND RIGHT))

Special and additional details/attributes of some assets have been collected. They are described below.

- Affected service
  - Type (ELECTRICITY / TELEPHONE / WATER)
- Carriageway
  - Type (BITUMINOUS / CONCRETE / ER / GRANULAR)
- Embankment
  - Height (m)
- Hectometre stone
  - N<sup>o</sup>
- High mast lights
  - N<sup>o</sup> of lamps
- Junction
  - Type (X/Y/T)
  - Name of road leading to left
  - N<sup>o</sup> of road leading to left
  - Name of road leading to right
  - N<sup>o</sup> of road leading to right
- Kilometre stone
  - N<sup>o</sup>
- Land use
  - Type (AGRICULTURAL / BARREN / COMMERCIAL / FOREST / RESIDENTIAL)
- Longitudinal road marking
  - Location
  - Type (According to Indian types and codes)
  - Code (According to Indian types and codes)
  - Color (WHITE / YELLOW)
- Median
  - Width (m)
- Median opening
  - Width (m)
- Pedestrian guardrail
  - Height (m)
- Punctual road marking
  - Location
  - Type (According to Indian types and codes)
  - Code (According to Indian types and codes)
  - Color (WHITE / YELLOW)
- Right of way

- LHS (m)
- RHS (m)
- Safety barrier
  - Type
  - Height (in cm)
- Shoulder
  - Type (ES/GS/PS)
- Sign
  - Type (According to Indian types, codes and dimensions)
  - Code (According to Indian types, codes and dimensions)
  - Value (speed limit)
  - Dimensions (SMALL / MEDIUM / LARGE)
  - Condition (FAIR / GOOD / POOR / VERY POOR)
- Street light
  - N<sup>o</sup> of lamps
- Terrain
  - Type (PLAIN/ROLLING/HILLY)
- Toll plaza
  - Name
- Village town
  - Name
  - Water body
  - Type (LAKE/RIVER/STREAM)

#### DATA ACCURACY

The integrated GPS/INS solution produces continuous, smooth position and orientation of the GPS Vision™ system even when the GPS signals are lost due to obstructions such as bridges, trees, tunnels or high-rise buildings.

An Inertial Navigation System (INS) is needed for measuring Camera location. Combining GPS, INS and Distance Measurement Indicator (DMI) data is a very efficient and accurate method to determine position (lat/long/height), azimuth, pitch and roll angles. The measurements of the inertial system come from two sensor triads, an accelerometer block and a gyro block. They are defined as three components of the specific force vector and three components of the body rotation rate. Integrated with GPS data, the system geometry data are calculated using the Kalman method.

The absolute accuracy that can be obtained for terrestrial data positions is sub-meter. If other companies are not specifying an absolute accuracy they most likely cannot met sub meter accuracy. The GPS Vision™ system was designed to deliver sub-meter RMS positions when visible features are within the camera field of view at distances closest to the front of the camera lenses. The closer to the lenses the more accurate they become. See accuracy profile below:



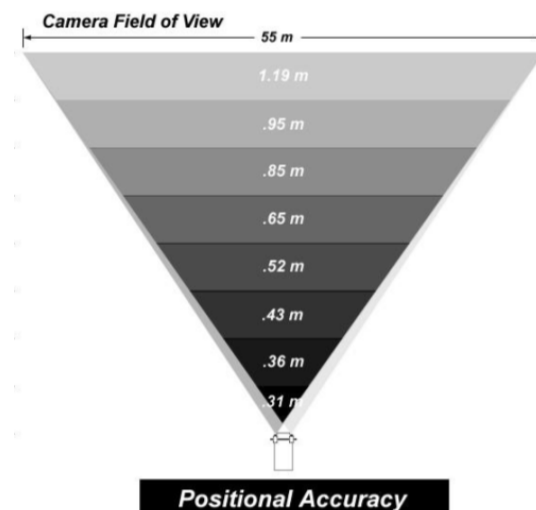


Figure 19 Positional accuracy

The entire system has mainly three components the data accuracy of which is crucial:

Component	Data accuracy
Optical camera	Sub meter level accuracy within 5 meter distance away from vehicle field of view
GPS system	Centimeter level accuracy
Lasers	Resolution Z (mm): 0.006 - 0.413
	Resolution X (mm): 0.044 - 1.100

Table 1 Accuracy

## ANNEXURE 2 PAVEMENT MATERIAL INVESTIGATION

S. No.	Chainage	Direction	Test Pit No.	Coordinates	
				X	Y
1	136+600	RHS	1	814821.00	1810201.00
2	138+100	LHS	2	815092.00	1808776.00
3	140+500	RHS	3	815333.00	1806322.00
4	143+000	LHS	4	815727.00	1803877.00
5	145+500	RHS	5	815852.00	1801401.00
6	148+000	LHS	6	816320.00	1798885.00
7	153+100	LHS	7	818909.00	1794955.00
8	150+300	RHS	8	816872.00	1796823.00
9	155+500	RHS	9	819089.00	1792571.00
10	158+000	LHS	10	817822.00	1790618.00
11	188+00	LHS	11	815593.00	1769870.00
12	198+100	LHS	12	180770.00	1761355.00
13	205+100	LHS	13	179210.00	1754655.00
14	207+500	LHS	14	180441.00	1752746.00
15	209+200	LHS	15	181278.00	1751083.00
16	178+000	LHS	16	812096.00	1776672.00
17	168+000	LHS	17	809418.00	1788711.00
18	170+500	RHS	18	.	.
19	200+200	RHS	19	180566.00	1759298.00
20	190+500	RHS	20	820472.00	1767755.00
21	183+000	LHS	21	814658.00	1772435.00
22	185+500	RHS	22	816601.00	1770871.00
23	193+000	LHS	23	180994.00	1764303.00
24	173+000	LHS	24	809755.00	1781103.00
25	175+500	RHS	25	810907.00	1778906.00
26	180+500	RHS	26	813244.00	1774428.00
27	195+200	RHS	27	180994.00	1764303.00
28	163+350	LHS	28	813010.00	1788565.00
29	160+500	RHS	29	815604.00	1789753.00
30	165+400	RHS	30	811187.00	1787618.00

Table 1. Test Pits Locations

TEST PIT REPORT					
Location:: KOTHAKOTA BYPASS-KURNOOL					
S.No.	Chainage	Direction	Test Pit No.	Description of Each Layer Material	Road Side Thickness (mm)
1	136+600	RHS	1	Bituminous Layer	220
				WMM (Base)	250
				GSB (Sub-base)	270
				TOTAL CRUST	740
2	138+100	LHS	2	Bituminous Layer	200
				WBM/WMM (Base)	240
				GSB (Sub-base)	280
				TOTAL CRUST	720
3	140+500	RHS	3	Bituminous Layer	240
				WMM (Base)	200
				GSB (Sub-base)	250
				TOTAL CRUST	690
4	143+000	LHS	4	Bituminous Layer	200
				WBM/WMM (Base)	240
				GSB (Sub-base)	250
				TOTAL CRUST	690
5	145+500	RHS	5	Bituminous Layer	180
				WMM (Base)	290
				GSB (Sub-base)	330
				TOTAL CRUST	800
6	148+000	LHS	6	Bituminous Layer	195
				WMM (Base)	260
				GSB (Sub-base)	300
				TOTAL CRUST	755
7	153+100	LHS	7	Bituminous Layer	240
				WBM/WMM (Base)	190
				GSB (Sub-base)	300
				TOTAL CRUST	730
8	150+300	RHS	8	Bituminous Layer	195
				WBM/WMM (Base)	310
				GSB (Sub-base)	320
				TOTAL CRUST	825
9	155+500	RHS	9	Bituminous Layer	190
				WMM (Base)	230
				GSB (Sub-base)	350
				TOTAL CRUST	770
10	158+000	LHS	10	Bituminous Layer	220
				WMM (Base)	240
				GSB (Sub-base)	230
				TOTAL CRUST	690

TEST PIT REPORT					
Location:: KOTHAKOTA BYPASS-KURNOOL					
S.No.	Chainage	Direction	Test Pit No.	Description of Each Layer Material	Road Side Thickness (mm)
11	188+00	LHS	11	Bituminous Layer	210
				WMM (Base)	240
				GSB (Sub-base)	260
				TOTAL CRUST	710
12	198+100	LHS	12	Bituminous Layer	230
				WBM/WMM (Base)	300
				GSB (Sub-base)	170
				TOTAL CRUST	700
13	205+100	LHS	13	Bituminous Layer	225
				WMM (Base)	210
				GSB (Sub-base)	240
				TOTAL CRUST	675
14	207+500	LHS	14	Bituminous Layer	230
				WMM (Base)	240
				GSB (Sub-base)	260
				TOTAL CRUST	730
15	209+200	LHS	15	Bituminous Layer	240
				WMM (Base)	250
				GSB (Sub-base)	240
				TOTAL CRUST	730
16	178+000	LHS	16	Bituminous Layer	195
				WMM (Base)	210
				GSB (Sub-base)	240
				TOTAL CRUST	645
17	168+000	LHS	17	Bituminous Layer	200
				WBM/WMM (Base)	240
				GSB (Sub-base)	260
				TOTAL CRUST	700
18	170+500	RHS	18	Bituminous Layer	200
				WMM (Base)	240
				GSB (Sub-base)	250
				TOTAL CRUST	690
19	200+200	RHS	19	Bituminous Layer	200
				WBM/WMM (Base)	250
				GSB (Sub-base)	260
				TOTAL CRUST	710
20	190+500	RHS	20	Bituminous Layer	220
				WMM (Base)	270
				GSB (Sub-base)	260
				TOTAL CRUST	750

TEST PIT REPORT					
Location:: KOTHAKOTA BYPASS-KURNOOL					
S.No.	Chainage	Direction	Test Pit No.	Description of Each Layer Material	Road Side Thickness (mm)
21	183+000	LHS	21	Bituminous Layer	200
				WMM (Base)	220
				GSB (Sub-base)	300
				TOTAL CRUST	720
22	185+500	RHS	22	Bituminous Layer	175
				WMM (Base)	200
				GSB (Sub-base)	240
				TOTAL CRUST	615
23	193+000	LHS	23	Bituminous Layer	225
				WMM (Base)	250
				GSB (Sub-base)	250
				TOTAL CRUST	725
24	173+000	LHS	24	Bituminous Layer	220
				WMM (Base)	180
				GSB (Sub-base)	230
				TOTAL CRUST	630
25	175+500	RHS	25	Bituminous Layer	220
				WMM (Base)	230
				GSB (Sub-base)	250
				TOTAL CRUST	700
26	180+500	RHS	26	Bituminous Layer	220
				WMM (Base)	160
				GSB (Sub-base)	200
				TOTAL CRUST	580
27	195+200	RHS	27	Bituminous Layer	210
				WBM/WMM (Base)	300
				GSB (Sub-base)	180
				TOTAL CRUST	690
28	163+350	LHS	28	Bituminous Layer	210
				WMM (Base)	225
				GSB (Sub-base)	200
				TOTAL CRUST	635
29	160+500	RHS	29	Bituminous Layer	210
				WMM (Base)	230
				GSB (Sub-base)	210
				TOTAL CRUST	650
30	165+400	RHS	30	Bituminous Layer	200
				WMM (Base)	180
				GSB (Sub-base)	210
				TOTAL CRUST	590



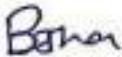
Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

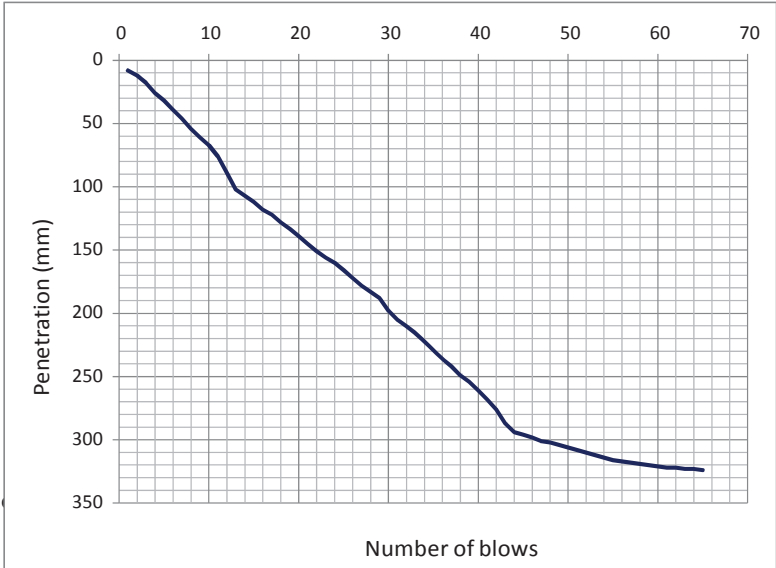
TEST RESULTS						
FIELD DENSITY AND MOISTURE CONTENT						
S.No.	Chainage	Direction	Test Pit No.	Bulk Density (gm/cc)	Moisture Content (%)	Dry Density (gm/cc)
1	136+600	RHS	1	2.08	6.45	1.95
2	138+100	LHS	2	2.09	6.68	1.96
3	140+500	RHS	3	2.19	6.46	2.06
4	143+000	LHS	4	2.21	7.40	2.06
5	145+500	RHS	5	2.14	5.58	2.03
6	148+000	LHS	6	2.10	5.24	2.00
7	153+100	LHS	7	2.06	6.58	1.93
8	150+300	RHS	8	1.99	9.25	1.82
9	155+500	RHS	9	2.20	4.53	2.10
10	158+000	LHS	10	2.22	10.57	2.01
11	188+000	LHS	11	2.08	11.89	1.86
12	198+100	LHS	12	2.24	6.97	2.09
13	205+100	LHS	13	2.11	8.29	1.95
14	207+500	LHS	14	2.07	11.08	1.86
15	209+200	LHS	15	2.15	11.36	1.93
16	178+000	LHS	16	2.13	5.59	2.02
17	168+000	LHS	17	2.13	5.88	2.01
18	170+500	RHS	18	2.08	5.91	1.96
19	200+200	RHS	19	2.23	12.42	1.98
20	190+500	RHS	20	1.98	5.56	1.88
21	183+000	LHS	21	2.25	5.73	2.13
22	185+500	RHS	22	2.15	7.44	2.00
23	193+000	LHS	23	2.15	5.05	2.05
24	173+000	LHS	24	2.12	5.26	2.01
25	175+500	RHS	25	1.90	5.60	1.80
26	180+500	RHS	26	2.23	6.23	2.10
27	195+200	RHS	27	2.24	6.16	2.11
28	163+350	LHS	28	2.27	7.96	2.10
29	160+500	RHS	29	2.13	6.63	2.00
30	165+400	RHS	30	2.09	9.85	1.90

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Test Results						
CBR values using DCPT						
S. No.	CH	Dirxn	DCPT No.	Test Pit No.	Layer	CBR Value (%)
1	136+600	RHS	1	1	Exposed Base	48
					Subgrade Base	13
2	138+100	LHS	2	2	Exposed Base	57
					Subgrade Base	17
3	140+500	RHS	3	3	Exposed Base	91
					Subgrade Base	69
4	143+000	LHS	4	4	Exposed Base	35
					Subgrade Base	16
5	145+500	RHS	5	5	Exposed Base	36
					Subgrade Base	16
6	148+000	LHS	6	6	Exposed Base	46
					Subgrade Base	18
7	153+100	LHS	7	7	Exposed Base	18
					Subgrade Base	10
8	150+300	RHS	8	8	Exposed Base	55
					Subgrade Base	13
9	155+500	RHS	9	9	Exposed Base	68
					Subgrade Base	NA
10	158+000	LHS	10	10	Exposed Base	37
					Subgrade Base	26
11	188+00	LHS	11	11	Exposed Base	46
					Subgrade Base	11
12	198+100	LHS	12	12	Exposed Base	28
					Subgrade Base	20
13	205+100	LHS	13	13	Exposed Base	24
					Subgrade Base	11
14	207+500	LHS	14	14	Exposed Base	29
					Subgrade Base	13
15	209+200	LHS	15	15	Exposed Base	32
					Subgrade Base	17
16	178+000	LHS	16	16	Exposed Base	25
					Subgrade Base	17
17	168+000	LHS	17	17	Exposed Base	29
					Subgrade Base	37
18	170+500	RHS	18	18	Exposed Base	38
					Subgrade Base	17
19	200+200	RHS	19	19	Exposed Base	24
					Subgrade Base	24
20	190+500	RHS	20	20	Exposed Base	34
					Subgrade Base	11

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

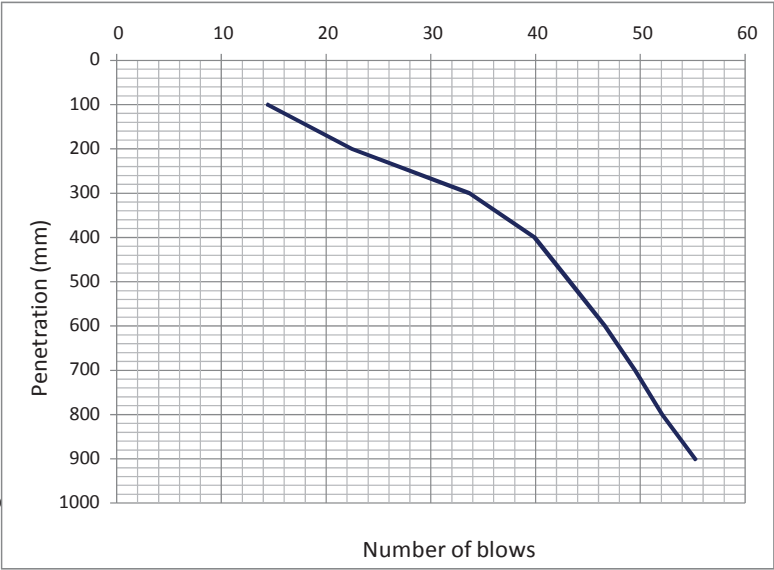
S. No.	CH	Dirxn	DCPT No.	Test Pit No.	Layer	CBR Value (%)
21	183+000	LHS	21	21	Exposed Base	27
					Subgrade Base	23
22	185+500	RHS	22	22	Exposed Base	34
					Subgrade Base	64
23	193+000	LHS	23	23	Exposed Base	35
					Subgrade Base	14
24	173+000	LHS	24	24	Exposed Base	60
					Subgrade Base	14
25	175+500	RHS	25	25	Exposed Base	32
					Subgrade Base	64
26	180+500	RHS	26	26	Exposed Base	22
					Subgrade Base	19
27	195+200	RHS	27	27	Exposed Base	81
					Subgrade Base	25
28	163+350	LHS	28	28	Exposed Base	65
					Subgrade Base	21
29	160+500	RHS	29	29	Exposed Base	60
					Subgrade Base	NA
30	165+400	RHS	30	30	Exposed Base	54
					Subgrade Base	16
<div></div> <div>Bibek Kumar Jha M.Tech.(Geotechnical Engineering) Authorized Signatory</div>						

APPENDIX-I			
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)			
Chainage : 136+600 RHS			
Test No.	DCPT -1	KOTHAKOT BYPASS-KURNOOL	Date: 26.02.18
	X: 814821.00	Y : 1810201.00	Exposed Base
Depth (mm)	Cumulative No. of blows	 <p>as per Road Note 31</p> <p>Rate of Settlement = 4.985 mm/blow</p> <p>CBR = 48 %</p>	
8	1		
12	2		
18	3		
26	4		
32	5		
39	6		
46	7		
54	8		
61	9		
67	10		
76	11		
89	12		
102	13		
107	14		
112	15		
118	16		
122	17		
128	18		
133	19		
139	20		
145	21		
151	22		
156	23		
160	24		
166	25		
172	26		
178	27		
183	28		
188	29		
198	30		
205	31		

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 136+600 RHS				
Test No.	DCPT - I	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X:	814821.00	Y :	1810201.00
		Exposed Base		
210	32			
216	33			
222	34			
229	35			
236	36			
242	37			
249	38			
254	39			
261	40			
268	41			
276	42			
287	43			
294	44			
296	45			
298	46			
301	47			
302	48			
304	49			
306	50			
308	51			
310	52			
312	53			
314	54			
316	55			
317	56			
318	57			
319	58			
320	59			
321	60			
322	61			
322	62			
323	63			
323	64			
324	65			

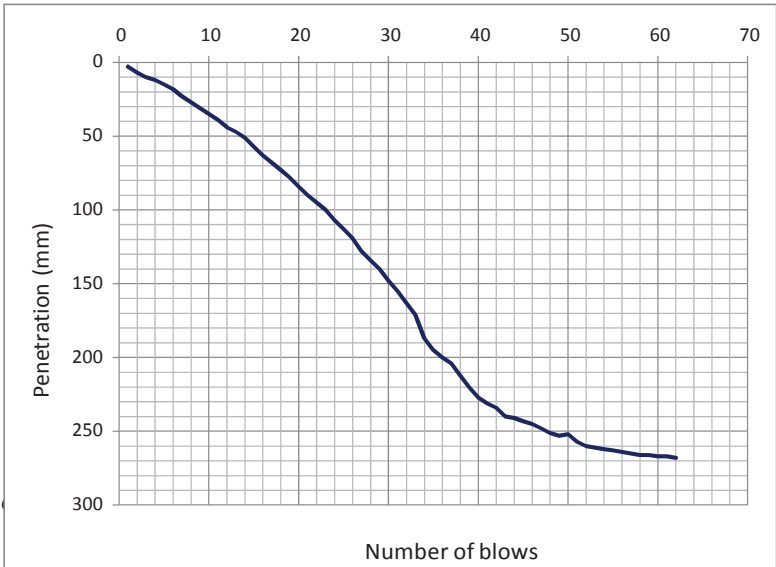
<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 136+600 RHS</b>				
Test No.	DCPT -I	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		X : 814821.00	Y : 1810201.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	14	14		
200	22	8		
300	34	11		
400	40	6		
500	43	3		
600	47	3		
700	50	3		
800	52	3		
900	55	3		



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>16.299</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>13</b>	<b>%</b>

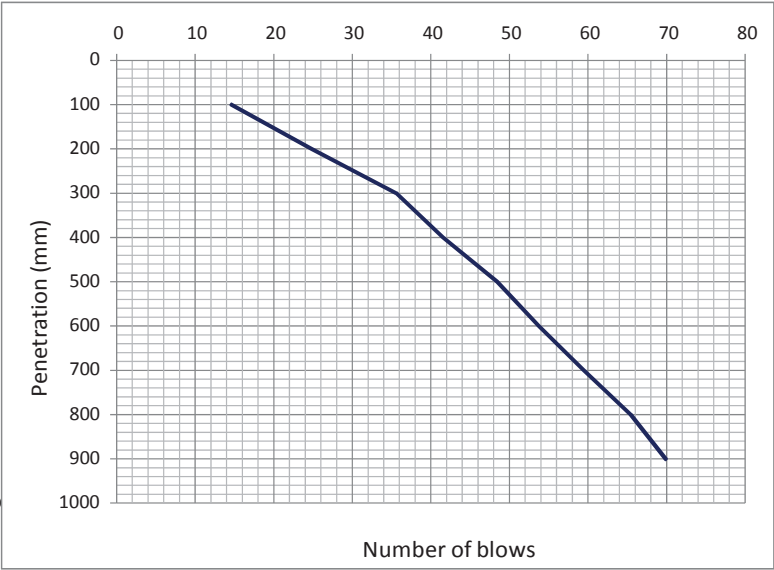


DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 138+100 LHS				
Test No.	DCPT -2	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X: 815092.00	Y : 1808776.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><p>as per Road Note 31</p><p>Rate of Settlement = 4.323 mm/blow</p><p>CBR = 57 %</p></div>		
3	1			
7	2			
10	3			
12	4			
15	5			
18	6			
23	7			
27	8			
31	9			
35	10			
39	11			
44	12			
47	13			
51	14			
57	15			
63	16			
68	17			
73	18			
78	19			
84	20			
90	21			
95	22			
100	23			
107	24			
113	25			
119	26			
128	27			
134	28			
140	29			
148	30			
155	31			
163	32			
171	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 138+100 LHS				
Test No.	DCPT -2	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X:	815092.00	Y :	1808776.00
		Exposed Base		
187	34			
195	35			
200	36			
204	37			
212	38			
220	39			
227	40			
231	41			
234	42			
240	43			
241	44			
243	45			
245	46			
248	47			
251	48			
253	49			
252	50			
257	51			
260	52			
261	53			
262	54			
263	55			
264	56			
265	57			
266	58			
266	59			
267	60			
267	61			
268	62			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 138+100 LHS</b>				
Test No.	DCPT -2	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		X : 815092.00	Y : 1808776.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	15			
200	25			
300	36			
400	42			
500	48			
600	54			
700	59			
800	65			
900	70			



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>12.882</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>17</b>	<b>%</b>

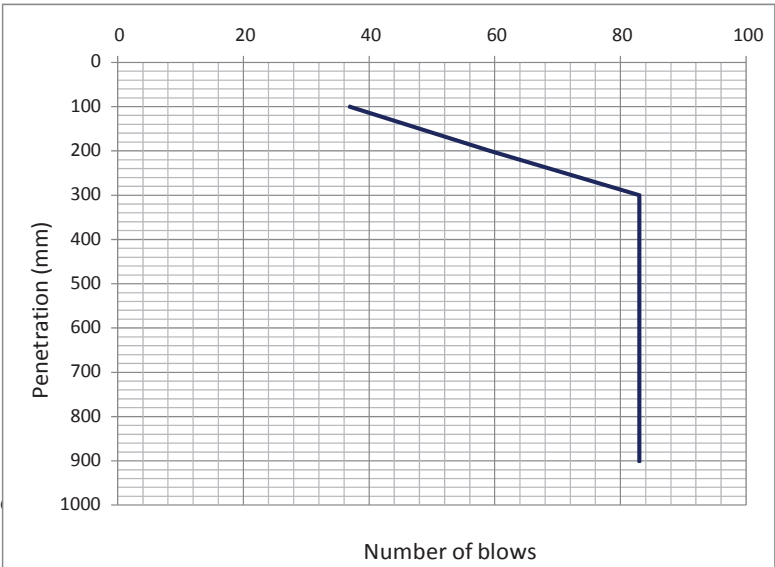
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 140+500 RHS				
Test No.	DCPT -3	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X: 815333.00	Y : 1806322.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><div><div><div>0</div><div>5</div><div>10</div><div>15</div><div>20</div><div>25</div><div>30</div></div><div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div><div>60</div><div>70</div><div>80</div></div><div><div>Penetration (mm)</div><div>Number of blows</div></div></div><div>as per Road Note 31</div><div><div>Rate of Settlement</div><div>=</div><div>2.840</div><div>mm/blow</div></div><div><div>CBR</div><div>=</div><div>91</div><div>%</div></div></div>		
21	1			
35	2			
39	3			
43	4			
46	5			
48	6			
52	7			
52	8			
55	9			
56	10			
56	11			
58	12			
59	13			
62	14			
63	15			
64	16			
64	17			
65	18			
65	19			
65	20			
67	21			
68	22			
69	23			
70	24			
71	25			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 140+500 RHS</b>				
Test No.	DCPT -3	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		<b>X :</b> 815333.00	<b>Y :</b> 1806322.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	37	37
200	59	22
300	83	24
400	83	0
500	83	0
600	83	0
700	83	0
800	83	0
900	83	0



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>3.614</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>69</b>	<b>%</b>

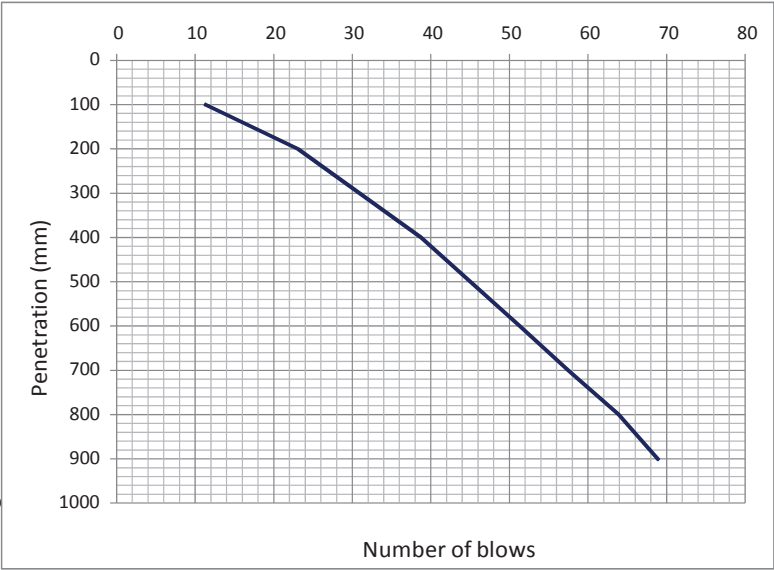
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 143+000 LHS				
Test No.	DCPT -4	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X: 815727.00	Y : 1803877.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div>		



Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

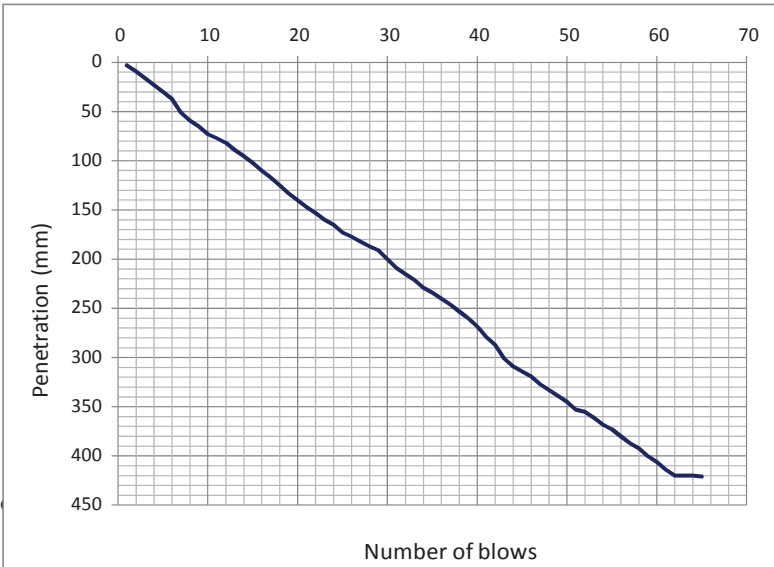
Chainage : 143+000 LHS				
Test No.	DCPT -4	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X:	815727.00	Y :	1803877.00
		Exposed Base		
236	34			
244	35			
251	36			
258	37			
266	38			
273	39			
289	40			
300	41			
309	42			
311	43			
316	44			
319	45			
323	46			
327	47			
333	48			
335	49			
335	50			
337	51			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 143+000 LHS</b>				
Test No.	DCPT -4	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		X : 815727.00	Y : 1803877.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	11	11		
200	23	12		
300	31	8		
400	39	8		
500	45	6		
600	51	6		
700	57	6		
800	64	6		
900	69	5		



**as per Road Note 31**

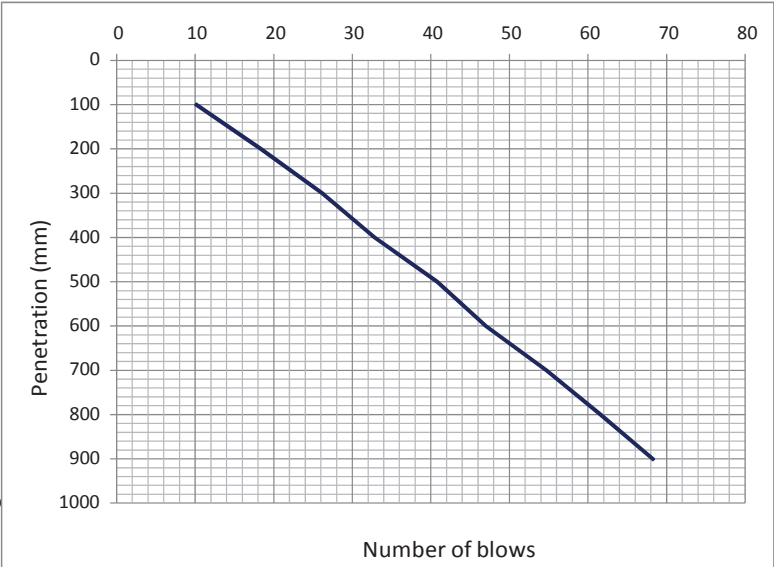
<b>Rate of Settlement</b>	=	<b>13.062</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>16</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 145+500 RHS				
Test No.	DCPT -5	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X: 815852.00	Y : 1801401.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div></div>		
3	1			
9	2			
16	3			
23	4			
30	5			
37	6			
51	7			
59	8			
65	9			
73	10			
77	11			
82	12			
89	13			
95	14			
102	15	<div><p>as per Road Note 31</p><p>Rate of Settlement = 6.477 mm/blow</p><p>CBR = 36 %</p></div>		
110	16			
117	17			
125	18			
133	19			
140	20			
147	21			
153	22			
160	23			
165	24			
173	25			
177	26			
182	27			
187	28			
191	29			
200	30			
209	31			
215	32			
221	33			

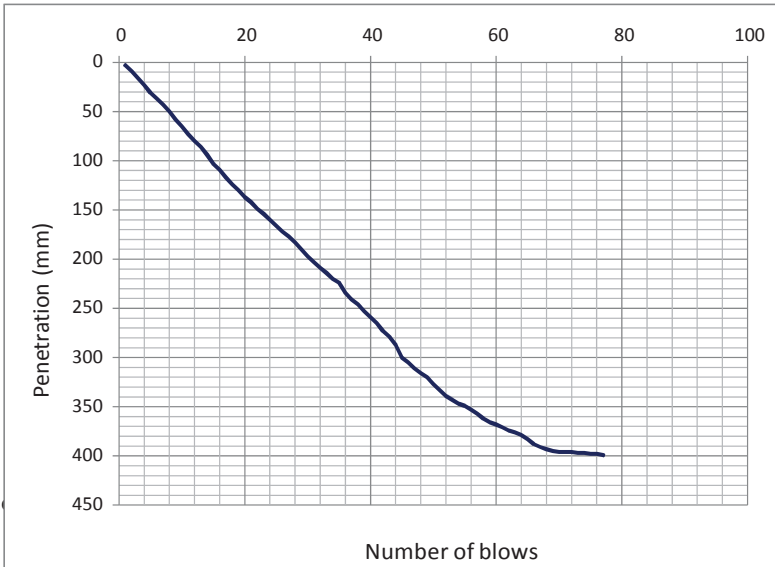
Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 145+500 RHS				
Test No.	DCPT -5	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X:	815852.00	Y :	1801401.00
		Exposed Base		
229	34			
234	35			
240	36			
246	37			
253	38			
260	39			
268	40			
279	41			
287	42			
301	43			
309	44			
314	45			
319	46			
327	47			
333	48			
339	49			
345	50			
353	51			
355	52			
361	53			
368	54			
373	55			
380	56			
387	57			
392	58			
400	59			
406	60			
414	61			
420	62			
420	63			
420	64			
421	65			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 145+500 RHS</b>				
Test No.	DCPT -5	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		X : 815852.00	Y : 1801401.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	10			
200	18			
300	26			
400	33			
500	41			
600	47			
700	55			
800	62			
900	68			



as per Road Note 31			
Rate of Settlement	=	13.184	mm/blow
CBR	=	16	%

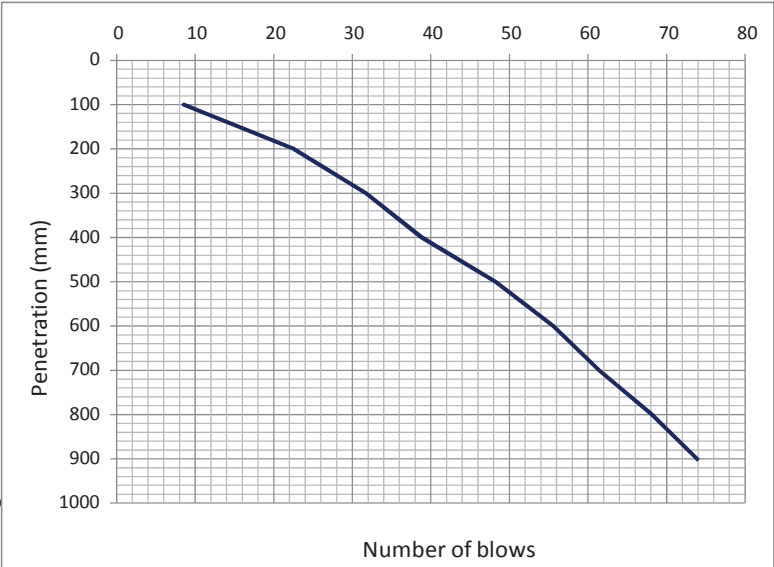
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 148+000 LHS				
Test No.	DCPT -6	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X: 816320.00	Y : 1798885.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><p>as per Road Note 31</p><p>Rate of Settlement = 5.182 mm/blow</p><p>CBR = 46 %</p></div>		
3	1			
9	2			
16	3			
23	4			
31	5			
37	6			
43	7			
50	8			
58	9			
65	10			
73	11			
80	12			
86	13			
94	14			
103	15			
109	16			
117	17			
124	18			
130	19			
137	20			
142	21			
149	22			
154	23			
160	24			
166	25			
172	26			
177	27			
183	28			
190	29			
197	30			
203	31			
209	32			
214	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 148+000 LHS				
Test No.	DCPT -6	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
	X:	816320.00	Y :	1798885.00
		Exposed Base		
220	34			
224	35			
234	36			
241	37			
246	38			
253	39			
259	40			
265	41			
273	42			
279	43			
287	44			
300	45			
305	46			
311	47			
316	48			
320	49			
327	50			
333	51			
339	52			
343	53			
347	54			
349	55			
353	56			
357	57			
362	58			
366	59			
368	60			
371	61			
374	62			
376	63			
379	64			
383	65			
388	66			
391	67			
393	68			
395	69			
396	70			
396	71			
396	72			
397	73			
397	74			
398	75			
398	76			
399	77			



<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 148+000 LHS</b>				
Test No.	DCPT -6	KOTHAKOT BYPASS-KURNOOL		Date: 26.02.18
		X : 816320.00	Y : 1798885.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	9			
200	23			
300	32			
400	39			
500	48			
600	56			
700	61			
800	68			
900	74			



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>12.182</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>18</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 153+100 LHS				
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X: 818909.00	Y : 1794955.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><p>as per Road Note 31</p><p>Rate of Settlement = 11.985 mm/blow</p><p>CBR = 18 %</p></div>		
8	1			
16	2			
24	3			
37	4			
46	5			
59	6			
68	7			
74	8			
87	9			
98	10			
110	11			
121	12			
132	13			
147	14			
154	15			
165	16			
179	17			
187	18			
200	19			
221	20			
237	21			
246	22			
259	23			
269	24			
278	25			
287	26			
300	27			
311	28			
327	29			
339	30			
347	31			
357	32			
371	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 153+100 LHS					
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL		Date:	27.02.18
	X:	818909.00	Y :	1794955.00	Exposed Base
386	34				
399	35				
408	36				
417	37				
429	38				
442	39				
457	40				
470	41				
487	42				
502	43				
516	44				
527	45				
541	46				
556	47				
565	48				
579	49				
592	50				
610	51				
619	52				
627	53				
637	54				
650	55				
661	56				
672	57				
684	58				
699	59				
711	60				
727	61				
739	62				
752	63				
768	64				
779	65				
789	66				
803	67				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 153+100 LHS</b>				
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL	Date:	27.02.18
		<b>X :</b> 818909.00	<b>Y :</b> 1794955.00	Subgrade Base

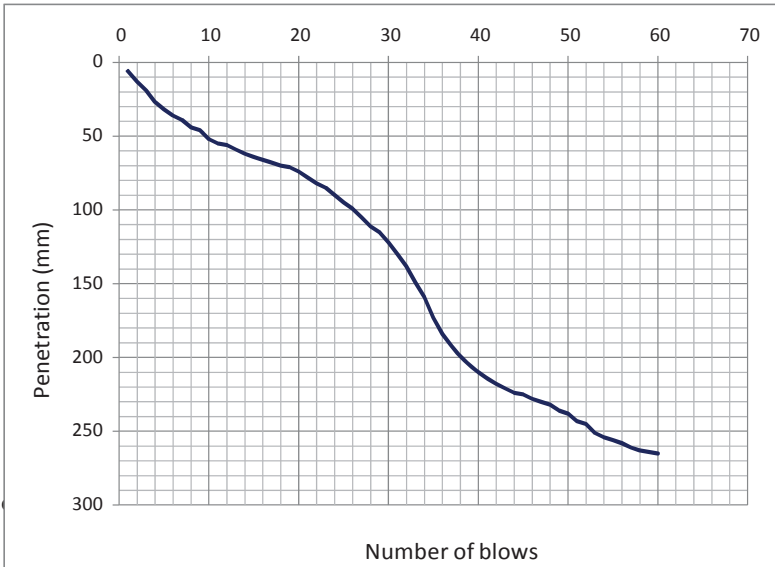
  

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	7	7
200	12	5
300	17	5
400	23	6
500	27	5
600	32	5
700	38	6
800	43	5
900	44	1

**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>20.493</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>10</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 150+300 RHS				
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X: 816872.00	Y : 1796823.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><p>as per Road Note 31</p><p>Rate of Settlement = 4.417 mm/blow</p><p>CBR = 55 %</p></div>		
6	1			
13	2			
19	3			
27	4			
32	5			
36	6			
39	7			
44	8			
46	9			
52	10			
55	11			
56	12			
59	13			
62	14			
64	15			
66	16			
68	17			
70	18			
71	19			
74	20			
78	21			
82	22			
85	23			
90	24			
95	25			
99	26			
105	27			
111	28			
115	29			
122	30			
130	31			
138	32			
149	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

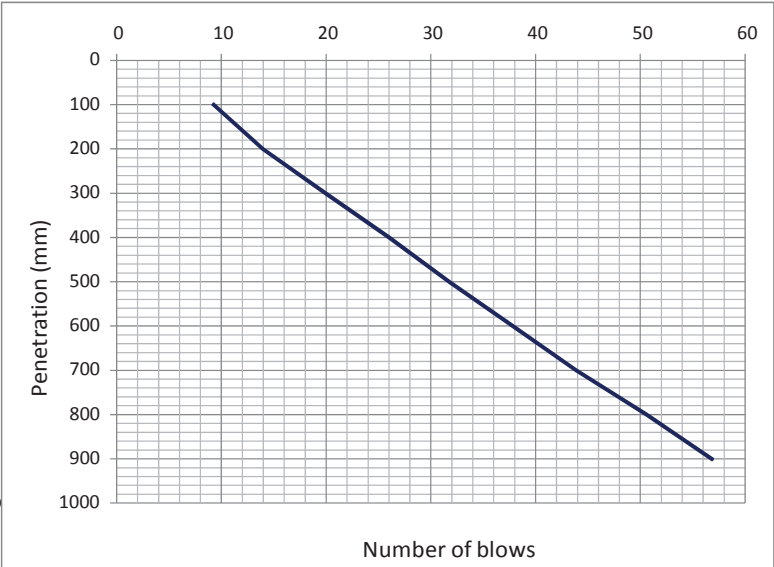
Chainage : 150+300 RHS				
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X:	816872.00	Y :	1796823.00
		Exposed Base		
159	34			
173	35			
184	36			
192	37			
199	38			
205	39			
210	40			
214	41			
218	42			
221	43			
224	44			
225	45			
228	46			
230	47			
232	48			
236	49			
238	50			
243	51			
245	52			
251	53			
254	54			
256	55			
258	56			
261	57			
263	58			
264	59			
265	60			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 150+300 RHS</b>				
Test No.	DCPT -8	KOTHAKOT BYPASS-KURNOOL	Date:	27.02.18
		<b>X :</b> 816872.00	<b>Y :</b> 1796823.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	9	9
200	14	5
300	20	6
400	26	6
500	32	6
600	38	6
700	44	6
800	51	7
900	57	6



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>15.842</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>13</b>	<b>%</b>



DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 155+500 RHS				
Test No.	DCPT -9	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X: 819089.00	Y : 1792571.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>&lt;/</div></div></div>		

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

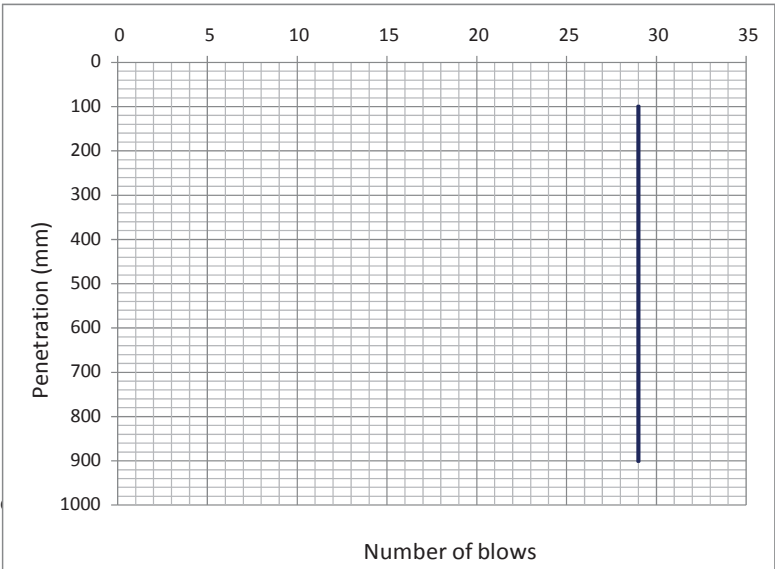
Chainage : 155+500 RHS				
Test No.	DCPT -9	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X:	819089.00	Y :	1792571.00
		Exposed Base		
139	34			
143	35			
147	36			
162	37			
166	38			
168	39			
172	40			
175	41			
179	42			
182	43			
185	44			
188	45			
191	46			
194	47			
198	48			
202	49			
204	50			
207	51			
210	52			
211	53			
213	54			
216	55			
219	56			
221	57			
224	58			
225	59			
226	60			
227	61			
228	62			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 155+500 RHS</b>				
Test No.	DCPT -9	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
		<b>X :</b> 819089.00	<b>Y :</b> 1792571.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	29	29
200	29	0
300	29	0
400	29	0
500	29	0
600	29	0
700	29	0
800	29	0
900	29	0



**as per Road Note 31**

<b>Rate of Settlement</b>	=	NA	mm/blow
<b>CBR</b>	=	NA	%

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 158+000 LHS				
Test No.	DCPT -10	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
	X: 817822.00	Y : 1790618.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div><p>as per Road Note 31</p><p>Rate of Settlement = 6.327 mm/blow</p><p>CBR = 37 %</p></div>		
5	1			
9	2			
14	3			
19	4			
23	5			
28	6			
35	7			
43	8			
53	9			
65	10			
77	11			
85	12			
92	13			
97	14			
102	15			
109	16			
116	17			
127	18			
132	19			
140	20			
147	21			
153	22			
163	23			
181	24			
187	25			
192	26			
200	27			
206	28			
212	29			
220	30			
229	31			
238	32			
246	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

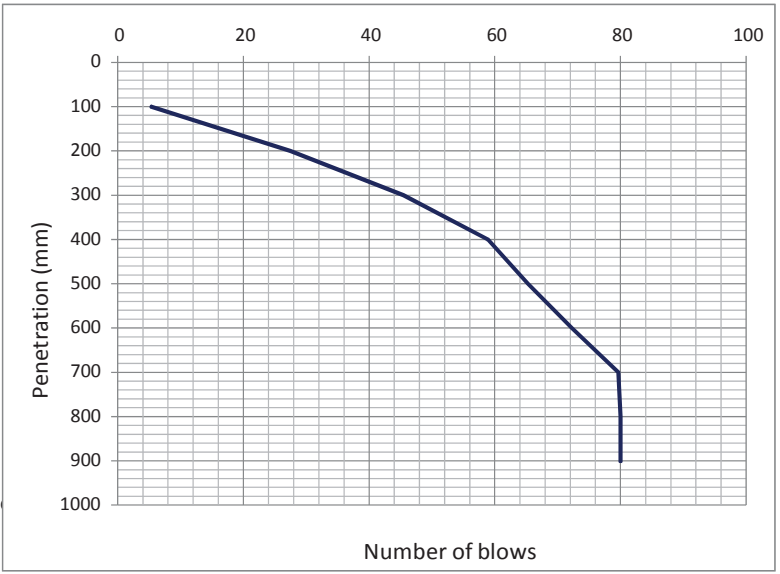
Chainage : 158+000 LHS					
Test No.	DCPT -10	KOTHAKOT BYPASS-KURNOOL		Date:	27.02.18
	<b>X:</b>	817822.00	<b>Y :</b>	1790618.00	Exposed Base
253	34				
263	35				
275	36				
283	37				
290	38				
297	39				
302	40				
305	41				
310	42				
312	43				
315	44				
320	45				
321	46				
322	47				
325	48				
326	49				
327	50				
328	51				
329	52				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 158+000 LHS</b>				
Test No.	DCPT -10	KOTHAKOT BYPASS-KURNOOL		Date: 27.02.18
		<b>X :</b> 817822.00	<b>Y :</b> 1790618.00	Subgrade Base

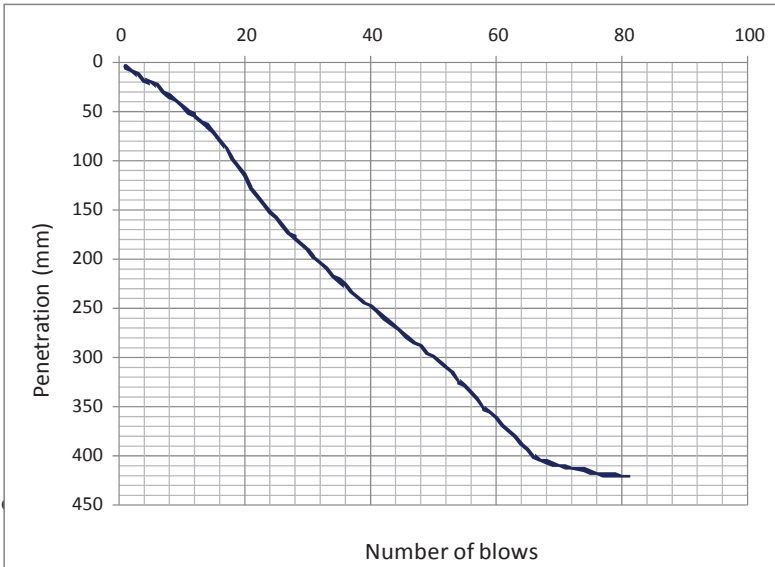
Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	5	5
200	27	22
300	46	18
400	59	13
500	65	6
600	72	7
700	80	7
800	80	0
900	80	0



**as per Road Note 31**


<b>Rate of Settlement</b>	=	<b>8.787</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>26</b>	<b>%</b>

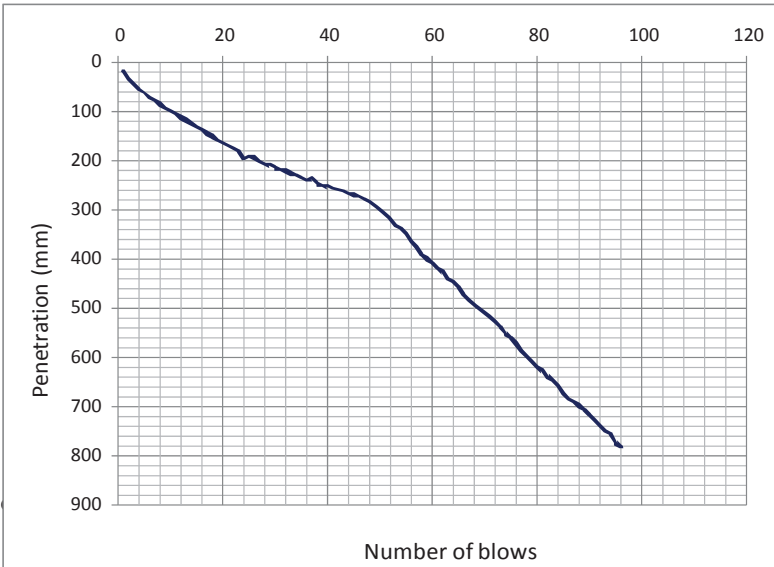
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 188+00 LHS				
Test No.	DCPT -11	KOTHAKOT BYPASS-KURNOOL		Date: 22.02.18
	X: 815593.00	Y : 1769870.00	Exposed Base	
Depth (mm)	Cumulative No. of blows	<div></div>		
3	1			
7	2			
11	3			
17	4			
19	5			
22	6			
28	7			
33	8			
37	9			
42	10			
49	11			
52	12			
59	13			
63	14			
70	15	as per Road Note 31		
77	16	Rate of Settlement = 5.185 mm/blow		
85	17	CBR = 46 %		
97	18			
104	19			
113	20			
127	21			
135	22			
142	23			
150	24			
157	25			
165	26			
173	27			
177	28			
183	29			
189	30			
198	31			
203	32			
209	33			



Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 188+00 LHS				
Test No.	DCPT -11	KOTHAKOT BYPASS-KURNOOL		Date: 22.02.18
	X:	815593.00	Y :	1769870.00
		Exposed Base		
215	34			
220	35			
225	36			
232	37			
237	38			
243	39			
246	40			
252	41			
257	42			
263	43			
268	44			
273	45			
278	46			
283	47			
287	48			
294	49			
298	50			
303	51			
309	52			
313	53			
323	54			
328	55			
335	56			
342	57			
350	58			
355	59			
360	60			
367	61			
373	62			
379	63			
387	64			
392	65			
399	66			
403	67			
405	68			
407	69			
409	70			
410	71			
411	72			
412	73			
413	74			
415	75			
417	76			
418	77			
418	78			
418	79			
419	80			
420	81			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>														
<b>Chainage : 188+000 LHS</b>														
Test No.	DCPT -11	KOTHAKOT BYPASS-KURNOOL		Date: 22.02.18										
		<b>X :</b> 815593.00	<b>Y :</b> 1769870.00	Subgrade Base										
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;"><b>No. of blows per 10 cm penetration</b></th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">16</td></tr> <tr><td style="padding: 5px;">11</td></tr> <tr><td style="padding: 5px;">6</td></tr> <tr><td style="padding: 5px;">5</td></tr> <tr><td style="padding: 5px;">3</td></tr> <tr><td style="padding: 5px;">2</td></tr> <tr><td style="padding: 5px;">2</td></tr> <tr><td style="padding: 5px;">2</td></tr> <tr><td style="padding: 5px;">3</td></tr> </tbody> </table>			<b>No. of blows per 10 cm penetration</b>	16	11	6	5	3	2	2	2	3
<b>No. of blows per 10 cm penetration</b>														
16														
11														
6														
5														
3														
2														
2														
2														
3														
100	16													
200	27													
300	33													
400	38													
500	40													
600	43													
700	44													
800	47													
900	50													
<p><b>as per Road Note 31</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 40%;"><b>Rate of Settlement</b></td> <td style="width: 10%; text-align: center;">=</td> <td style="width: 20%; text-align: center;"><b>18.182</b></td> <td style="width: 30%; text-align: right;"><b>mm/blow</b></td> </tr> <tr> <td><b>CBR</b></td> <td style="text-align: center;">=</td> <td style="text-align: center;"><b>11</b></td> <td style="text-align: right;"><b>%</b></td> </tr> </table>					<b>Rate of Settlement</b>	=	<b>18.182</b>	<b>mm/blow</b>	<b>CBR</b>	=	<b>11</b>	<b>%</b>		
<b>Rate of Settlement</b>	=	<b>18.182</b>	<b>mm/blow</b>											
<b>CBR</b>	=	<b>11</b>	<b>%</b>											

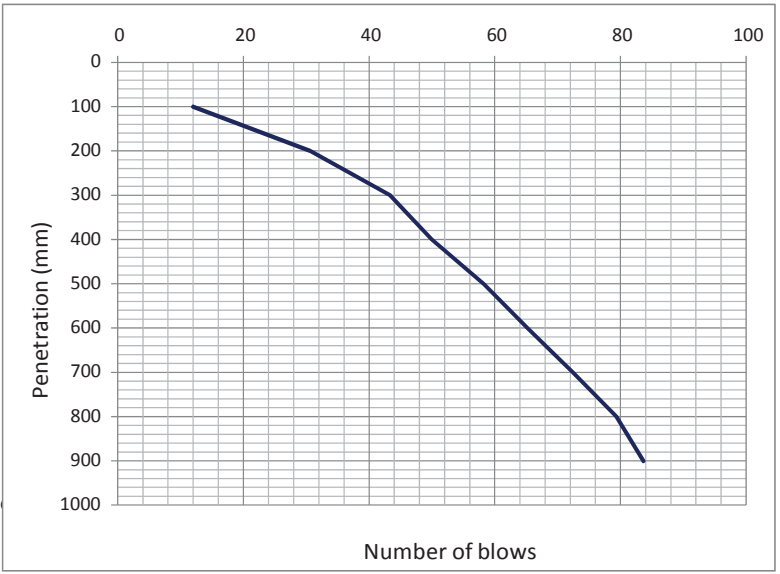
DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 198+100 LHS				
Test No.	DCPT -12	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	180770.00	Y :	1761355.00
			Exposed Base	
Depth (mm)	Cumulative No. of blows	<div></div>		
17	1			
29	2			
40	3			
52	4			
60	5			
68	6			
75	7			
83	8			
89	9			
95	10			
102	11			
109	12			
115	13			
122	14			
129	15	<div>as per Road Note 31</div> <div>Rate of Settlement = 8.125 mm/blow</div> <div>CBR = 28 %</div>		
135	16			
143	17			
148	18			
156	19			
161	20			
166	21			
172	22			
178	23			
193	24			
188	25			
192	26			
198	27			
203	28			
206	29			
212	30			
215	31			
219	32			
223	33			

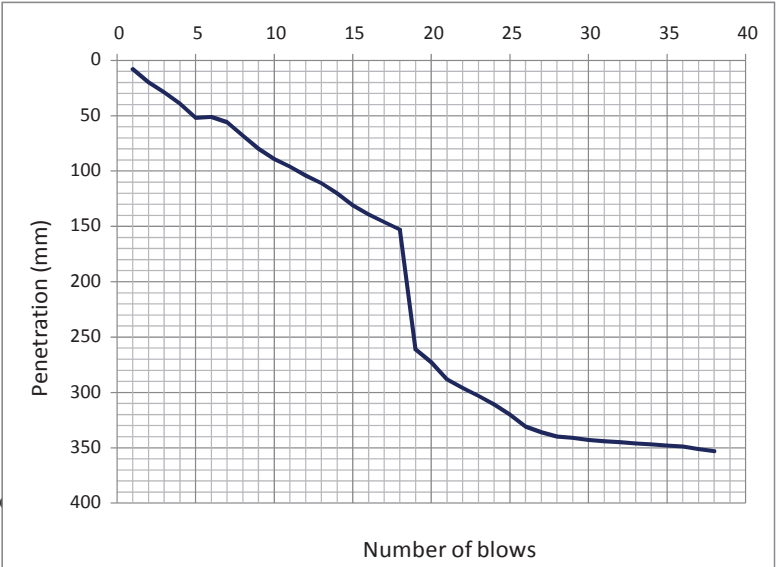
Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 198+100 LHS				
Test No.	DCPT -12	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	180770.00	Y :	1761355.00
		Exposed Base		
226	34			
232	35			
236	36			
233	37			
244	38			
247	39			
250	40			
254	41			
257	42			
259	43			
264	44			
267	45			
270	46			
274	47			
281	48			
289	49			
297	50			
307	51			
317	52			
327	53			
335	54			
348	55			
360	56			
373	57			
389	58			
397	59			
405	60			
417	61			
424	62			
436	63			
445	64			
454	65			
469	66			
480	67			
491	68			
499	69			
507	70			
516	71			
527	72			
535	73			
549	74			
556	75			
570	76			
583	77			
595	78			
607	79			
616	80			
624	81			
636	82			
645	83			
656	84			
670	85			
680	86			
687	87			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 198+100 LHS					
Test No.	DCPT -12	KOTHAKOTA BYPASS-KURNOOL			Date: 25.02.18
	X :	180770.00	Y :	1761355.00	Exposed Base
695	88				
703	89				
716	90				
725	91				
735	92				
746	93				
754	94				
771	95				
780	96				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>														
<b>Chainage : 198+100 LHS</b>														
Test No.	DCPT -12	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18										
		X : 180770.00	Y : 1761355.00	Subgrade Base										
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;"><b>No. of blows per 10 cm penetration</b></th> </tr> </thead> <tbody> <tr><td style="text-align: center; padding: 5px;">12</td></tr> <tr><td style="text-align: center; padding: 5px;">19</td></tr> <tr><td style="text-align: center; padding: 5px;">13</td></tr> <tr><td style="text-align: center; padding: 5px;">7</td></tr> <tr><td style="text-align: center; padding: 5px;">8</td></tr> <tr><td style="text-align: center; padding: 5px;">7</td></tr> <tr><td style="text-align: center; padding: 5px;">7</td></tr> <tr><td style="text-align: center; padding: 5px;">7</td></tr> <tr><td style="text-align: center; padding: 5px;">4</td></tr> </tbody> </table>			<b>No. of blows per 10 cm penetration</b>	12	19	13	7	8	7	7	7	4
<b>No. of blows per 10 cm penetration</b>														
12														
19														
13														
7														
8														
7														
7														
7														
4														
100	12													
200	31													
300	43													
400	50													
500	58													
600	65													
700	72													
800	79													
900	84													
 <p style="text-align: center; margin-top: 10px;"><b>as per Road Note 31</b></p> <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 40%;"><b>Rate of Settlement</b></td> <td style="width: 10%; text-align: center;">=</td> <td style="width: 20%; text-align: center;"><b>10.759</b></td> <td style="width: 30%; text-align: right;"><b>mm/blow</b></td> </tr> <tr> <td><b>CBR</b></td> <td style="text-align: center;">=</td> <td style="text-align: center;"><b>20</b></td> <td style="text-align: right;"><b>%</b></td> </tr> </table>					<b>Rate of Settlement</b>	=	<b>10.759</b>	<b>mm/blow</b>	<b>CBR</b>	=	<b>20</b>	<b>%</b>		
<b>Rate of Settlement</b>	=	<b>10.759</b>	<b>mm/blow</b>											
<b>CBR</b>	=	<b>20</b>	<b>%</b>											

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 205+100 LHS				
Test No.	DCPT -13	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	179210.00	Y : 1754655.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
8	1			
20	2			
29	3			
39	4			
52	5			
51	6			
56	7			
68	8			
80	9			
89	10			
96	11			
104	12			
111	13			
120	14			
131	15	<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement</b> = <b>9.289</b> mm/blow</p> <p><b>CBR</b> = <b>24</b> %</p>		
139	16			
146	17			
153	18			
261	19			
273	20			
288	21			
296	22			
303	23			
311	24			
320	25			
331	26			
336	27			
340	28			
341	29			
343	30			
344	31			
345	32			
346	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 205+100 LHS					
Test No.	DCPT -13	KOTHAKOTA BYPASS-KURNOOL		Date:	25.02.18
	X :	179210.00	Y :	1754655.00	Exposed Base
347	34				
348	35				
349	36				
351	37				
353	38				

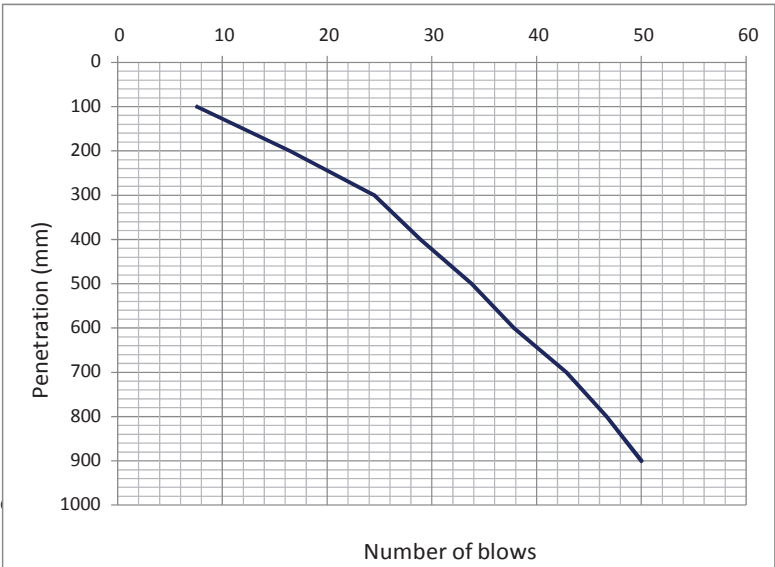


<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 205+100 LHS</b>				
Test No.	DCPT -13	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
		<b>X :</b> 179210.00	<b>Y :</b> 1754655.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	8	8
200	16	9
300	25	8
400	29	4
500	34	5
600	38	4
700	43	5
800	47	4
900	50	3

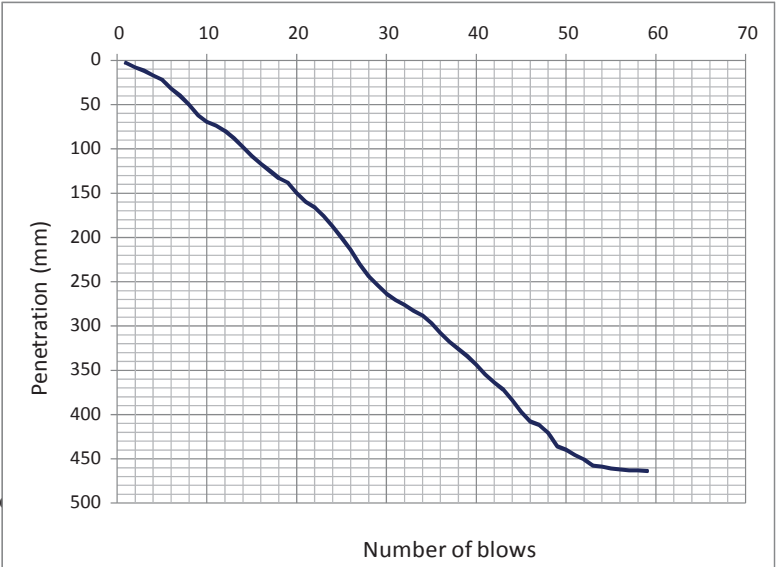
  



**as per Road Note 31**

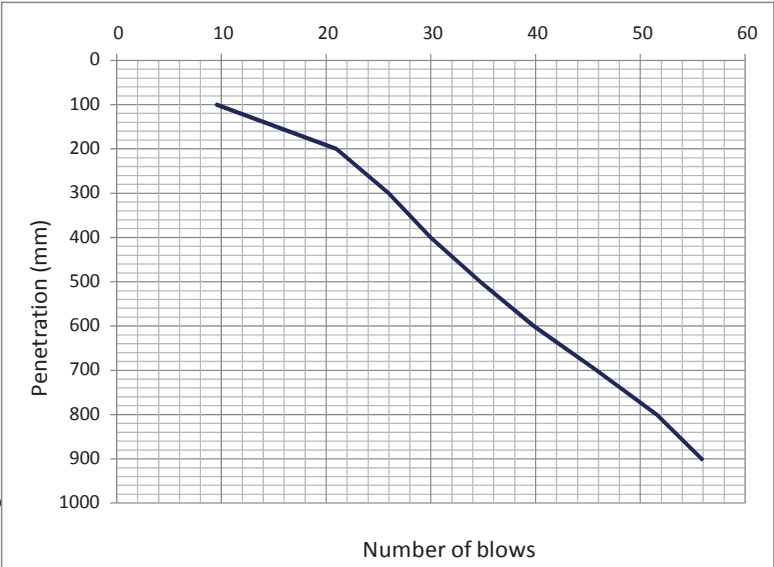
<b>Rate of Settlement</b>	=	<b>18.000</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>11</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 207+500 LHS				
Test No.	DCPT -14	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	180441.00	Y : 1752746.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
3	1			
8	2			
12	3			
17	4			
22	5			
32	6			
40	7			
50	8			
62	9			
70	10			
74	11			
80	12			
88	13			
98	14			
108	15	<p>as per Road Note 31</p> <p>Rate of Settlement = 7.864 mm/blow</p> <p>CBR = 29 %</p>		
117	16			
125	17			
133	18			
138	19			
150	20			
160	21			
166	22			
176	23			
188	24			
201	25			
214	26			
230	27			
244	28			
254	29			
264	30			
271	31			
276	32			
283	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 207+500 LHS				
Test No.	DCPT -14	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	180441.00	Y :	1752746.00
		Exposed Base		
288	34			
297	35			
308	36			
318	37			
326	38			
334	39			
344	40			
355	41			
364	42			
372	43			
384	44			
397	45			
408	46			
412	47			
421	48			
436	49			
440	50			
446	51			
451	52			
458	53			
459	54			
461	55			
462	56			
463	57			
463	58			
464	59			

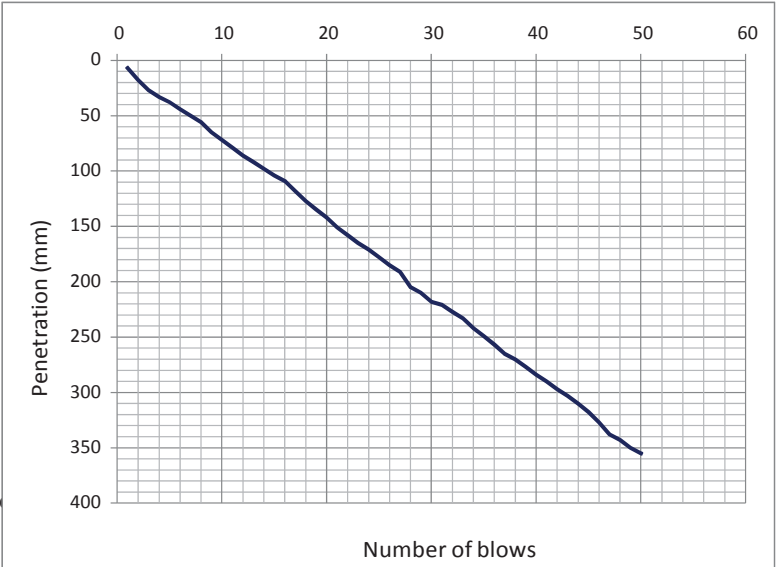
<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 207+500 LHS</b>				
Test No.	DCPT -14	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
		X :	180441.00	Y : 1752746.00
		Subgrade Base		
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<b>No. of blows per 10 cm penetration</b>		
100	10	10		
200	21	11		
300	26	5		
400	30	4		
500	35	5		
600	40	5		
700	46	6		
800	52	6		
900	56	4		



**as per Road Note 31**

**Rate of Settlement**                      =            **16.109**            **mm/blow**

**CBR**    =            **13**                      **%**

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 209+200 LHS				
Test No.	DCPT -15	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
	X :	181278.00	Y :	1751083.00
				Exposed Base
Depth (mm)	Cumulative No. of blows			
7	1			
18	2			
27	3			
33	4			
38	5			
44	6			
50	7			
56	8			
65	9			
72	10			
79	11			
86	12			
92	13			
98	14			
104	15	<p>as per Road Note 31</p> <p>Rate of Settlement = 7.100 mm/blow</p> <p>CBR = 32 %</p>		
109	16			
118	17			
127	18			
135	19			
142	20			
151	21			
158	22			
165	23			
171	24			
178	25			
185	26			
191	27			
205	28			
210	29			
218	30			
221	31			
227	32			
233	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 209+200 LHS					
Test No.	DCPT -15	KOTHAKOTA BYPASS-KURNOOL		Date:	25.02.18
	X :	181278.00	Y :	1751083.00	Exposed Base
242	34				
249	35				
257	36				
265	37				
270	38				
277	39				
284	40				
290	41				
297	42				
303	43				
310	44				
318	45				
327	46				
338	47				
343	48				
350	49				
355	50				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 209+200 LHS</b>				
Test No.	DCPT -15	KOTHAKOTA BYPASS-KURNOOL		Date: 25.02.18
		<b>X :</b> 181278.00	<b>Y :</b> 1751083.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	12	12
200	19	7
300	27	8
400	36	9
500	44	8
600	51	8
700	58	7
800	65	7
900	70	5

Number of blows	Penetration (mm)
12	100
19	200
27	300
36	400
44	500
51	600
58	700
65	800
70	900

**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>12.885</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>17</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 178+000 LHS				
Test No.	DCPT -16	KOTHAKOTA BYPASS-KURNOOL		Date: 23.02.18
	X :	812096.00	Y : 1776672.00	Exposed Base
Depth (mm)	Cumulative No. of blows	<p>as per Road Note 31</p> <p>Rate of Settlement = 8.872 mm/blow</p> <p>CBR = 25 %</p>		
12	1			
19	2			
25	3			
32	4			
38	5			
45	6			
52	7			
61	8			
68	9			
79	10			
88	11			
97	12			
108	13			
118	14			
128	15			
137	16			
145	17			
152	18			
159	19			
166	20			
172	21			
179	22			
189	23			
199	24			
207	25			
215	26			
222	27			
229	28			
236	29			
246	30			
256	31			
268	32			
281	33			



Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

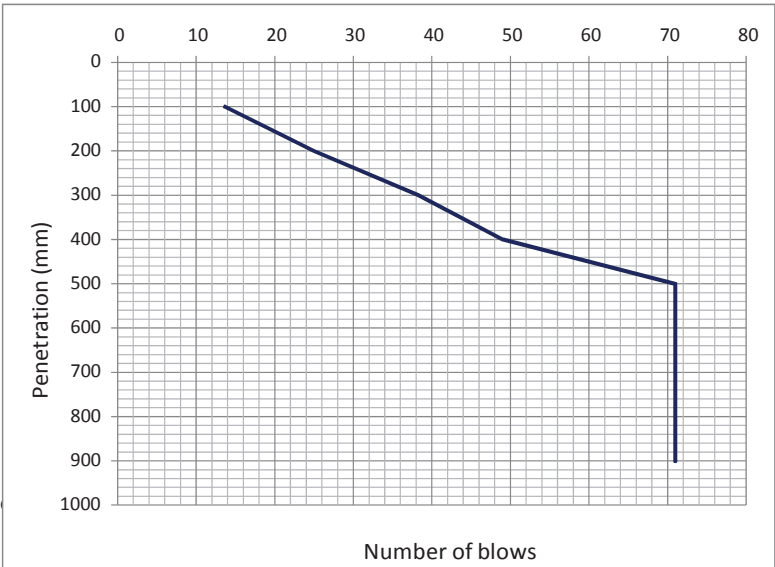
Chainage : 178+000 LHS					
Test No.	DCPT -16	KOTHAKOTA BYPASS-KURNOOL		Date:	23.02.18
	<b>X :</b>	812096.00	<b>Y :</b>	1776672.00	Exposed Base
296	34				
311	35				
325	36				
342	37				
359	38				
377	39				
397	40				
407	41				
410	42				
410	43				
412	44				
413	45				
414	46				
417	47				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 178+000 LHS</b>				
Test No.	DCPT -16	KOTHAKOTA BYPASS-KURNOOL		Date: 23.02.18
		<b>X :</b> 812096.00	<b>Y :</b> 1776672.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	14	14
200	25	11
300	38	13
400	49	11
500	71	22
600	71	0
700	71	0
800	71	0
900	71	0

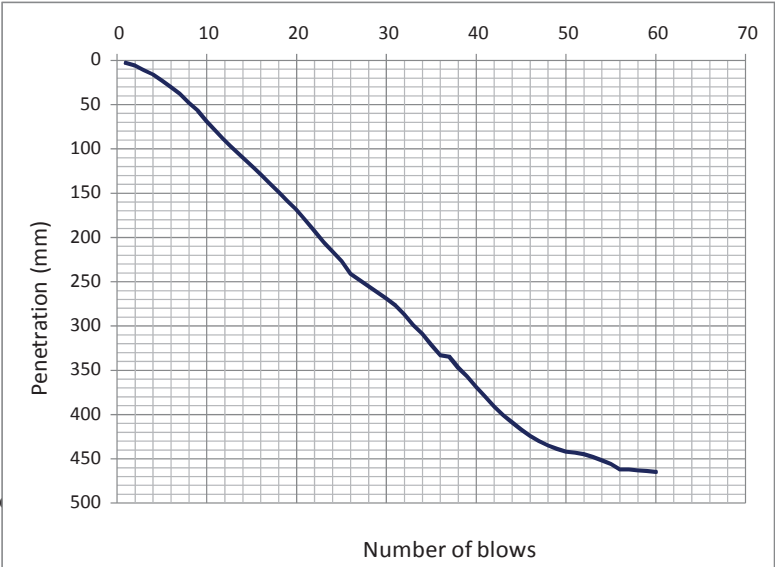
  



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>12.676</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>17</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 168+000 LHS				
Test No.	DCPT -17	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
	X :	809418.00	Y : 1788711.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
3	1			
6	2			
11	3			
16	4			
23	5			
30	6			
38	7			
48	8			
57	9			
69	10			
80	11			
91	12			
100	13			
110	14			
119	15	<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement</b> = <b>7.750</b> mm/blow</p> <p><b>CBR</b> = <b>29</b> %</p>		
129	16			
139	17			
149	18			
159	19			
169	20			
181	21			
193	22			
205	23			
216	24			
227	25			
241	26			
248	27			
255	28			
262	29			
269	30			
277	31			
287	32			
299	33			

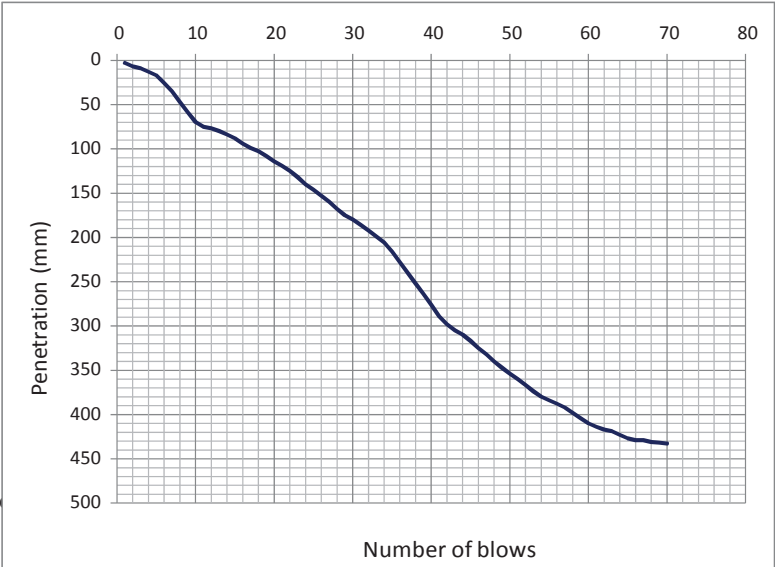
Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 168+000 LHS					
Test No.	DCPT -17	KOTHAKOTA BYPASS TO KURNOOL		Date:	23.02.18
	<b>X :</b>	809418.00	<b>Y :</b>	1788711.00	Exposed Base
309	34				
321	35				
333	36				
335	37				
347	38				
357	39				
369	40				
380	41				
391	42				
401	43				
409	44				
417	45				
424	46				
430	47				
435	48				
439	49				
442	50				
443	51				
445	52				
448	53				
452	54				
456	55				
462	56				
462	57				
463	58				
464	59				
465	60				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>														
<b>Chainage : 168+000 LHS</b>														
Test No.	DCPT - 17	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18										
		<b>X :</b> 809418.00	<b>Y :</b> 1788711.00	Subgrade Base										
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;"><b>No. of blows per 10 cm penetration</b></th> </tr> </thead> <tbody> <tr><td style="text-align: center; padding: 5px;">100</td></tr> <tr><td style="text-align: center; padding: 5px;">200</td></tr> <tr><td style="text-align: center; padding: 5px;">300</td></tr> <tr><td style="text-align: center; padding: 5px;">400</td></tr> <tr><td style="text-align: center; padding: 5px;">500</td></tr> <tr><td style="text-align: center; padding: 5px;">600</td></tr> <tr><td style="text-align: center; padding: 5px;">700</td></tr> <tr><td style="text-align: center; padding: 5px;">800</td></tr> <tr><td style="text-align: center; padding: 5px;">900</td></tr> </tbody> </table>			<b>No. of blows per 10 cm penetration</b>	100	200	300	400	500	600	700	800	900
<b>No. of blows per 10 cm penetration</b>														
100														
200														
300														
400														
500														
600														
700														
800														
900														
100	9	9												
200	19	9												
300	28	10												
400	45	17												
500	80	35												
600	80	0												
700	80	0												
800	80	0												
900	80	0												
<p><b>as per Road Note 31</b></p> <table style="margin: auto;"> <tr> <td style="padding: 5px;"><b>Rate of Settlement</b></td> <td style="padding: 5px;">=</td> <td style="padding: 5px;"><b>6.250</b></td> <td style="padding: 5px;"><b>mm/blow</b></td> </tr> <tr> <td style="padding: 5px;"><b>CBR</b></td> <td style="padding: 5px;">=</td> <td style="padding: 5px;"><b>37</b></td> <td style="padding: 5px;"><b>%</b></td> </tr> </table>					<b>Rate of Settlement</b>	=	<b>6.250</b>	<b>mm/blow</b>	<b>CBR</b>	=	<b>37</b>	<b>%</b>		
<b>Rate of Settlement</b>	=	<b>6.250</b>	<b>mm/blow</b>											
<b>CBR</b>	=	<b>37</b>	<b>%</b>											

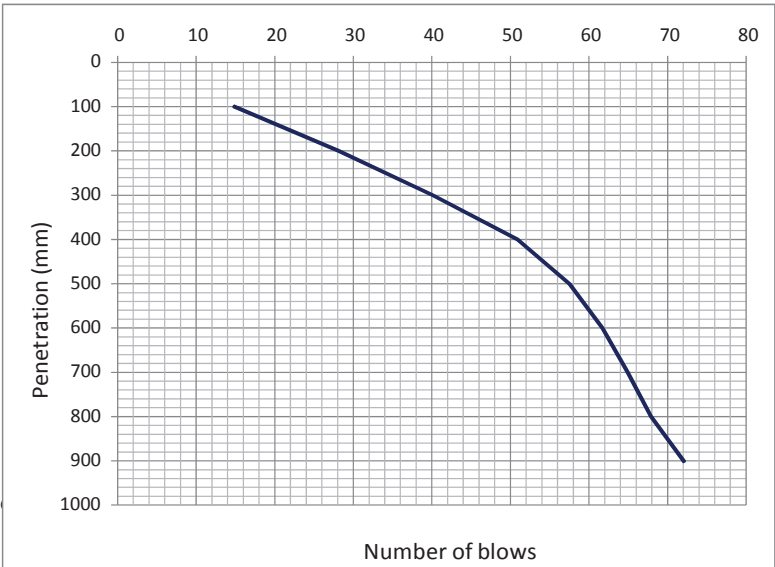
The graph plots Penetration (mm) on the y-axis (0 to 1000) against the Number of blows on the x-axis (0 to 100). The curve shows a non-linear relationship, starting at (0, 100) and ending at (80, 900). The data points from the table are plotted and connected by a smooth curve.

Number of blows	Penetration (mm)
0	100
10	150
20	200
30	250
40	300
50	350
60	400
70	450
80	500
80	900

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 170+500 RHS				
Test No.	DCPT -18	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
	X : -		Y : -	Exposed Base
Depth (mm)	Cumulative No. of blows			
3	1			
7	2			
9	3			
13	4			
17	5			
26	6			
35	7			
47	8			
59	9			
70	10			
75	11			
77	12			
80	13			
84	14	<p>as per Road Note 31</p> <p>Rate of Settlement = 6.186 mm/blow</p> <p>CBR = 38 %</p>		
88	15			
94	16			
99	17			
103	18			
108	19			
114	20			
119	21			
125	22			
132	23			
140	24			
146	25			
153	26			
160	27			
168	28			
175	29			
180	30			
186	31			
192	32			
199	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 170+500 RHS				
Test No.	DCPT -18	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
	X :-		Y :-	Exposed Base
206	34			
216	35			
228	36			
240	37			
252	38			
264	39			
276	40			
289	41			
298	42			
305	43			
310	44			
317	45			
325	46			
332	47			
340	48			
347	49			
354	50			
360	51			
367	52			
374	53			
380	54			
384	55			
388	56			
392	57			
398	58			
404	59			
410	60			
414	61			
417	62			
419	63			
423	64			
427	65			
429	66			
429	67			
431	68			
432	69			
433	70			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 170+500 RHS</b>				
Test No.	DCPT -18	KOTHAKOTA BYPASS TO KURNOOL	Date:	23.02.18
		X : -	Y : -	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<b>No. of blows per 10 cm penetration</b>		
100	15	15		
200	28	13		
300	40	12		
400	51	11		
500	58	7		
600	62	4		
700	65	3		
800	68	3		
900	72	4		
<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement</b>                      =        <b>12.493</b>        <b>mm/blow</b></p> <p><b>CBR</b>    =        <b>17</b>                      <b>%</b></p>				



DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 200+200 RHS				
Test No.	DCPT -19	KOTHAKOTA BYPASS TO KURNOOL		Date: 25.02.18
	X :	180566.00	Y : 1759298.00	Exposed Base
Depth (mm)	Cumulative No. of blows	<p>as per Road Note 31</p> <p>Rate of Settlement = 9.287 mm/blow</p> <p>CBR = 24 %</p>		
6	1			
11	2			
15	3			
20	4			
26	5			
32	6			
39	7			
46	8			
53	9			
61	10			
67	11			
76	12			
85	13			
94	14			
102	15			
112	16			
120	17			
129	18			
137	19			
147	20			
154	21			
160	22			
171	23			
180	24			
192	25			
201	26			
209	27			
220	28			
231	29			
239	30			
250	31			
262	32			
273	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

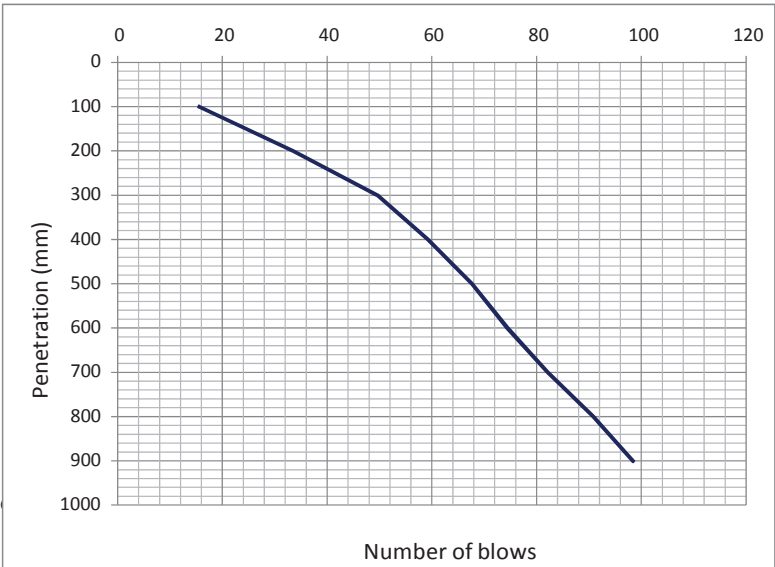
Chainage : 200+200 RHS				
Test No.	DCPT -19	KOTHAKOTA BYPASS TO KURNOOL		Date: 25.02.18
	X :	180566.00	Y :	1759298.00
		Exposed Base		
280	34			
291	35			
299	36			
307	37			
314	38			
321	39			
332	40			
338	41			
346	42			
354	43			
363	44			
371	45			
380	46			
391	47			
399	48			
408	49			
417	50			
424	51			
430	52			
446	53			
452	54			
462	55			
473	56			
487	57			
499	58			
514	59			
522	60			
537	61			
551	62			
562	63			
574	64			
585	65			
597	66			
602	67			
611	68			
622	69			
633	70			
644	71			
653	72			
664	73			
679	74			
689	75			
701	76			
713	77			
721	78			
732	79			
741	80			
752	81			
760	82			
769	83			
778	84			
787	85			
797	86			
808	87			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 200+200 RHS</b>				
Test No.	DCPT -19	KOTHAKOTA BYPASS TO KURNOOL	Date:	25.02.18
		<b>X :</b> 180566.00	<b>Y :</b> 1759298.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	16	16
200	34	18
300	50	16
400	59	10
500	68	8
600	74	7
700	82	8
800	91	9
900	98	8



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>9.148</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>24</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 190+500 RHS				
Test No.	DCPT -20	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
	X :	820472.00	Y : 1767755.00	Exposed Base
Depth (mm)	Cumulative No. of blows	<p>as per Road Note 31</p> <p>Rate of Settlement = 6.837 mm/blow</p> <p>CBR = 34 %</p>		
4	1			
10	2			
17	3			
21	4			
24	5			
27	6			
29	7			
31	8			
34	9			
39	10			
45	11			
48	12			
53	13			
61	14			
70	15			
81	16			
89	17			
98	18			
105	19			
112	20			
121	21			
130	22			
140	23			
147	24			
154	25			
157	26			
165	27			
174	28			
186	29			
191	30			
200	31			
212	32			
224	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

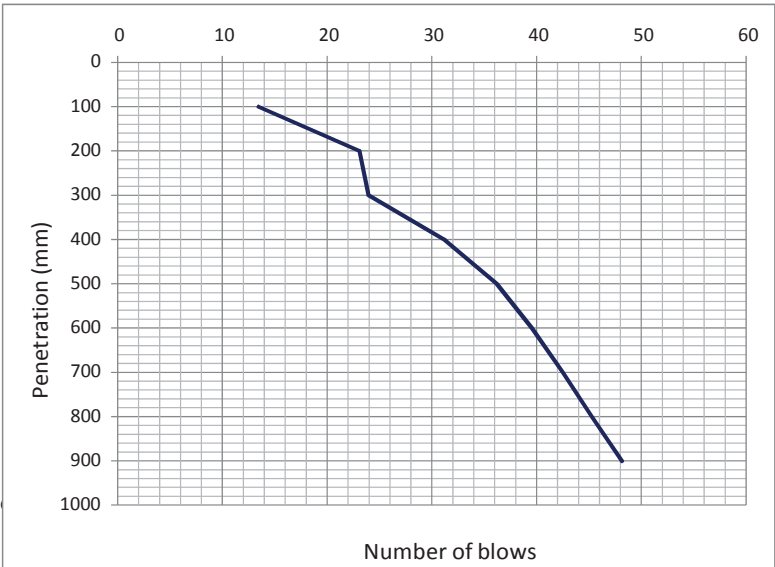
Chainage : 190+500 RHS					
Test No.	DCPT -20	KOTHAKOTA BYPASS TO KURNOOL		Date:	22.02.18
	<b>X :</b>	820472.00	<b>Y :</b>	1767755.00	Exposed Base
236	34				
242	35				
250	36				
256	37				
266	38				
274	39				
283	40				
286	41				
291	42				
294	43				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 190+500 RHS</b>				
Test No.	DCPT -20	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
		<b>X :</b> 820472.00	<b>Y :</b> 1767755.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	13	13
200	23	10
300	24	1
400	31	7
500	36	5
600	40	3
700	42	3
800	45	3
900	48	3

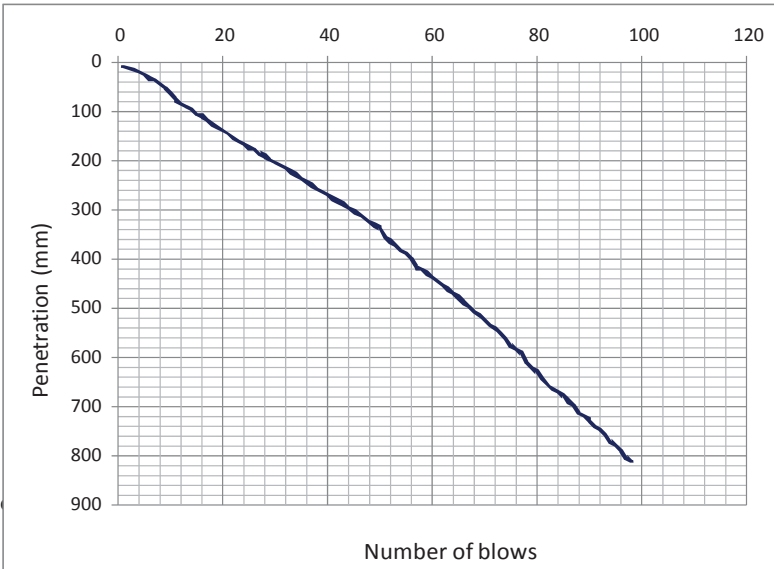
  



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>18.705</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>11</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 183+000 LHS				
Test No.	DCPT -21	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
	X :	814658.00	Y : 1772435.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
6	1			
10	2			
14	3			
18	4			
23	5			
30	6			
34	7			
41	8			
48	9			
61	10			
73	11			
80	12			
86	13			
95	14			
103	15	<p>as per Road Note 31</p> <p>Rate of Settlement = 8.255 mm/blow</p> <p>CBR = 27 %</p>		
106	16			
115	17			
123	18			
130	19			
135	20			
142	21			
149	22			
156	23			
165	24			
171	25			
176	26			
183	27			
188	28			
196	29			
200	30			
206	31			
212	32			
220	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 183+000 LHS				
Test No.	DCPT -21	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
	X :	814658.00	Y : 1772435.00	Exposed Base
226	34			
234	35			
241	36			
248	37			
254	38			
261	39			
267	40			
274	41			
280	42			
285	43			
293	44			
300	45			
307	46			
313	47			
320	48			
328	49			
334	50			
352	51			
361	52			
370	53			
378	54			
387	55			
396	56			
414	57			
418	58			
426	59			
434	60			
442	61			
450	62			
458	63			
465	64			
475	65			
486	66			
492	67			
503	68			
511	69			
521	70			
531	71			
540	72			
549	73			
560	74			
573	75			
580	76			
588	77			
606	78			
618	79			
626	80			
641	81			
652	82			
661	83			
668	84			
675	85			
686	86			
696	87			



Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

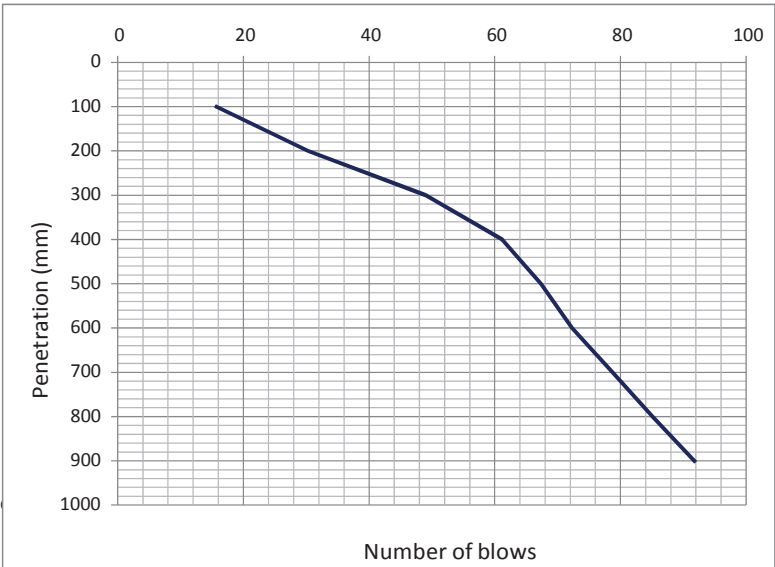
Chainage : 183+000 LHS					
Test No.	DCPT -21	KOTHAKOTA BYPASS TO KURNOOL		Date:	23.02.18
	X :	814658.00	Y :	1772435.00	Exposed Base
710	88				
717	89				
725	90				
737	91				
745	92				
756	93				
768	94				
776	95				
787	96				
801	97				
809	98				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 183+000 LHS</b>				
Test No.	DCPT -21	KOTHAKOTA BYPASS TO KURNOOL		Date: 23.02.18
		<b>X :</b> 814658.00	<b>Y :</b> 1772435.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	16	16
200	30	15
300	49	19
400	61	12
500	67	6
600	72	5
700	79	6
800	85	6
900	92	7

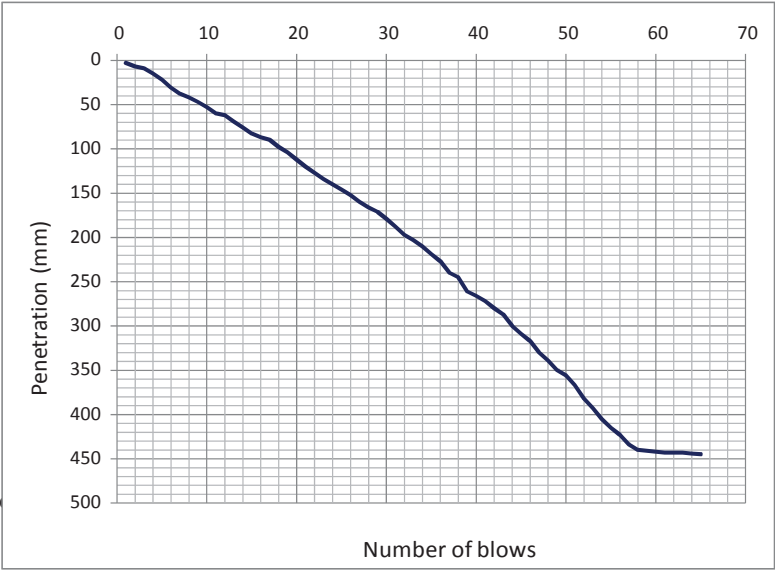
  



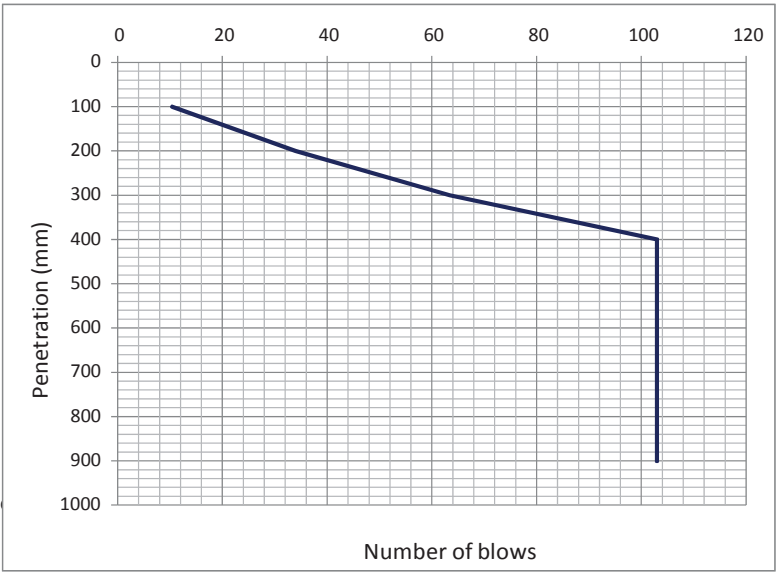
**as per Road Note 31**

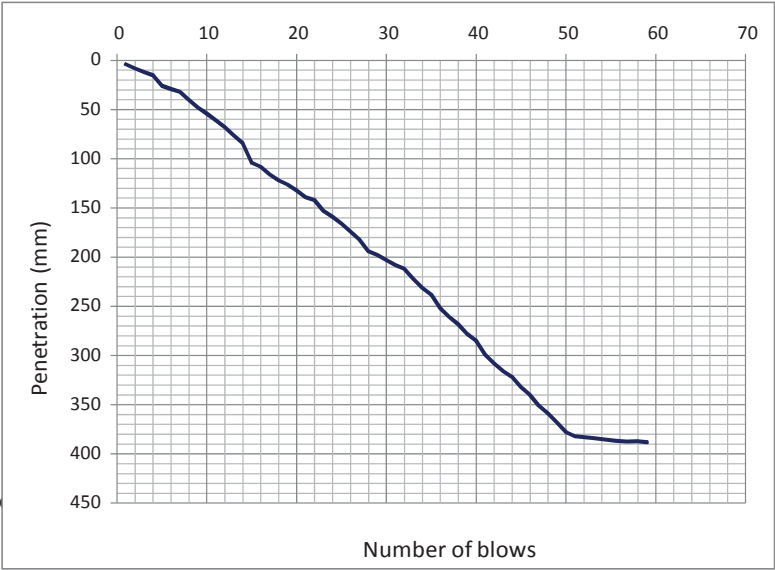
<b>Rate of Settlement</b>	=	<b>9.811</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>23</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 185+500 RHS				
Test No.	DCPT -22	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
	X :	816601.00	Y : 1770871.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
3	1			
7	2			
9	3			
15	4			
22	5			
31	6			
38	7			
42	8			
47	9			
53	10			
60	11			
62	12			
69	13			
76	14			
83	15	<p>as per Road Note 31</p> <p>Rate of Settlement = 6.846 mm/blow</p> <p>CBR = 34 %</p>		
87	16			
90	17			
98	18			
104	19			
112	20			
120	21			
127	22			
134	23			
140	24			
146	25			
152	26			
160	27			
166	28			
171	29			
179	30			
188	31			
197	32			
203	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 185+500 RHS				
Test No.	DCPT -22	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
	X :	816601.00	Y : 1770871.00	Exposed Base
210	34			
219	35			
227	36			
240	37			
245	38			
261	39			
266	40			
272	41			
280	42			
287	43			
300	44			
309	45			
317	46			
330	47			
339	48			
350	49			
356	50			
367	51			
382	52			
393	53			
405	54			
415	55			
423	56			
434	57			
440	58			
441	59			
442	60			
443	61			
443	62			
443	63			
444	64			
445	65			

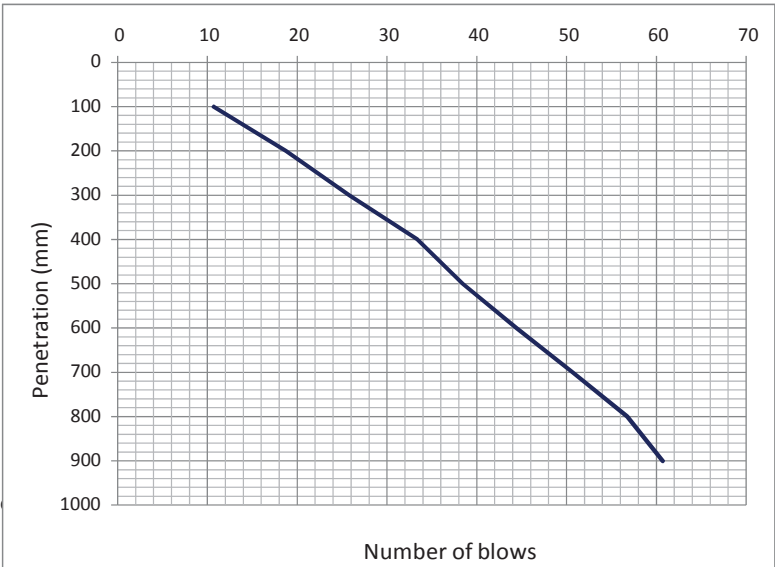
<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 185+500 RHS</b>				
Test No.	DCPT -22	KOTHAKOTA BYPASS TO KURNOOL	Date:	22.02.18
		<b>X :</b> 816601.00	<b>Y :</b> 1770871.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<b>No. of blows per 10 cm penetration</b>		
100	10	10		
200	34	24		
300	63	29		
400	103	40		
500	103	0		
600	103	0		
700	103	0		
800	103	0		
900	103	0		
<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement</b>                      =              <b>3.883</b>              <b>mm/blow</b></p> <p><b>CBR</b>    =              <b>64</b>              <b>%</b></p>				

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 193+000 LHS				
Test No.	DCPT -23	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
	X :	180994.00	Y : 1764303.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
4	1			
8	2			
12	3			
15	4			
26	5			
29	6			
32	7			
40	8			
48	9			
54	10			
61	11			
68	12			
76	13			
84	14			
104	15	<p>as per Road Note 31</p> <p>Rate of Settlement = 6.576 mm/blow</p> <p>CBR = 35 %</p>		
108	16			
116	17			
122	18			
126	19			
132	20			
139	21			
142	22			
153	23			
159	24			
166	25			
174	26			
182	27			
194	28			
198	29			
203	30			
208	31			
212	32			
222	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 193+000 LHS					
Test No.	DCPT -23	KOTHAKOTA BYPASS TO KURNOOL		Date:	22.02.18
	<b>X :</b>	180994.00	<b>Y :</b>	1764303.00	Exposed Base
231	34				
238	35				
252	36				
261	37				
268	38				
278	39				
285	40				
299	41				
308	42				
316	43				
322	44				
332	45				
340	46				
351	47				
359	48				
368	49				
378	50				
382	51				
383	52				
384	53				
385	54				
386	55				
387	56				
387	57				
387	58				
388	59				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 193+000 LHS</b>				
Test No.	DCPT -23	KOTHAKOTA BYPASS TO KURNOOL		Date: 22.02.18
		X : 180994.00	Y : 1764303.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	11	11		
200	19	8		
300	26	7		
400	33	8		
500	38	5		
600	44	6		
700	51	6		
800	57	6		
900	61	4		

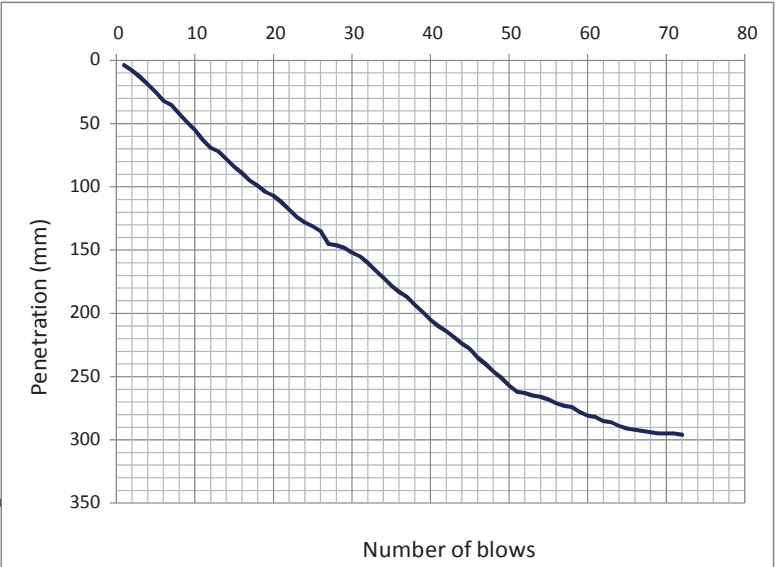


**as per Road Note 31**

**Rate of Settlement**      =      **14.832**      **mm/blow**

**CBR**                              =      **14**      **%**

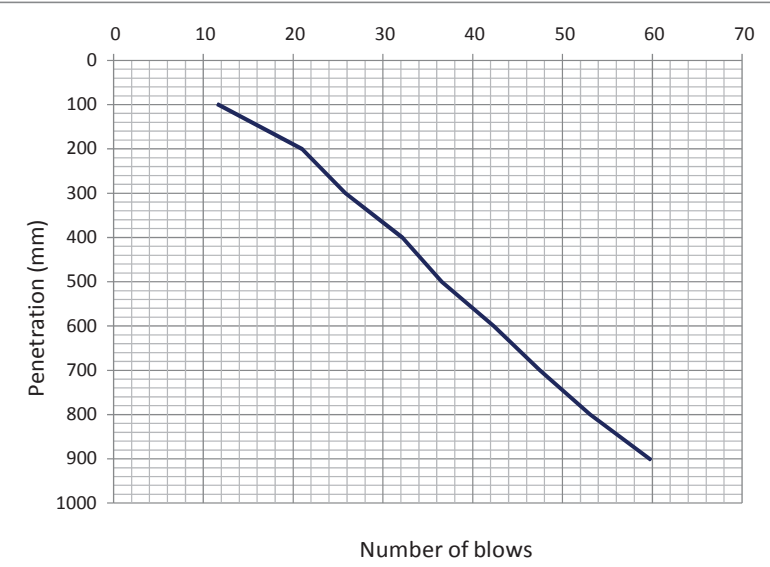


DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)					
Chainage : 173+000 LHS					
Test No.	DCPT -24	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	809755.00	Y :	1781103.00
		Exposed Base			
Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration	 <p>as per Road Note 31</p> <p>Rate of Settlement = 4.111 mm/blow</p> <p>CBR = 60 %</p>		
4	1	1			
8	2	1			
13	3	1			
19	4	1			
25	5	1			
32	6	1			
35	7	1			
42	8	1			
49	9	1			
55	10	1			
63	11	1			
69	12	1			
72	13	1			
78	14	1			
84	15	1			
89	16	1			
95	17	1			
99	18	1			
104	19	1			
107	20	1			
112	21	1			
118	22	1			
124	23	1			
128	24	1			
131	25	1			
135	26	1			
145	27	1			
146	28	1			
148	29	1			
152	30	1			
155	31	1			
160	32	1			
166	33	1			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

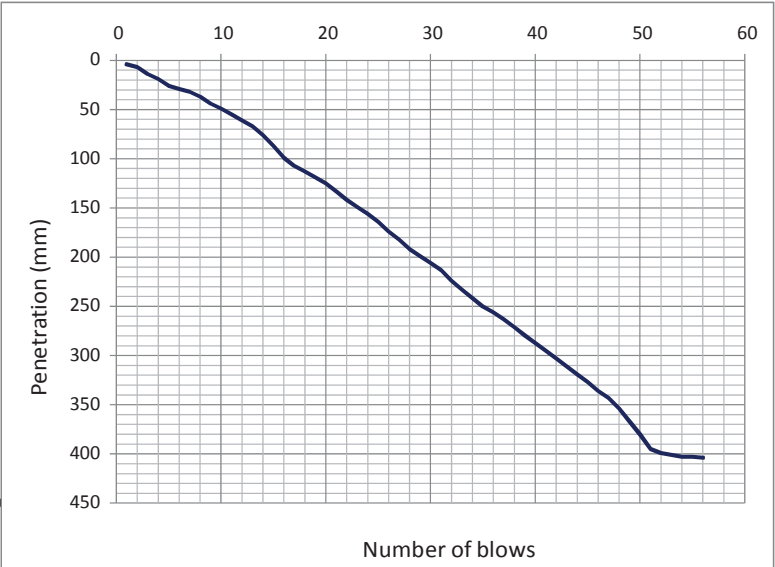
Chainage : 173+000 LHS					
Test No.	DCPT -24	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	809755.00	Y :	1781103.00
			Exposed Base		
172	34	1			
178	35	1			
183	36	1			
187	37	1			
193	38	1			
199	39	1			
205	40	1			
210	41	1			
214	42	1			
219	43	1			
224	44	1			
228	45	1			
235	46	1			
240	47	1			
246	48	1			
251	49	1			
257	50	1			
262	51	1			
263	52	1			
265	53	1			
266	54	1			
268	55	1			
271	56	1			
273	57	1			
274	58	1			
278	59	1			
281	60	1			
282	61	1			
285	62	1			
286	63	1			
289	64	1			
291	65	1			
292	66	1			
293	67	1			
294	68	1			
295	69	1			
295	70	1			
295	71	1			
296	72	1			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 173+000 LHS</b>				
Test No.	DCPT -24	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	809755.00	Y : 1781103.00
		Subgrade Base		
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	12			
200	21			
300	26			
400	32			
500	37			
600	42			
700	47			
800	53			
900	60			



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>15.067</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>14</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)					
Chainage : 175+500 RHS					
Test No.	DCPT -25	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	810907.00	Y :	1778906.00
		Exposed Base			
Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration			
4	1	1			
7	2	1			
14	3	1			
19	4	1			
26	5	1			
29	6	1			
32	7	1			
37	8	1			
44	9	1			
49	10	1			
55	11	1			
61	12	1			
67	13	1			
76	14	1			
87	15	1	<p>as per Road Note 31</p> <p>Rate of Settlement = 7.214 mm/blow</p> <p>CBR = 32 %</p>		
99	16	1			
107	17	1			
113	18	1			
119	19	1			
125	20	1			
133	21	1			
142	22	1			
149	23	1			
156	24	1			
164	25	1			
174	26	1			
182	27	1			
192	28	1			
199	29	1			
206	30	1			
213	31	1			
224	32	1			
233	33	1			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

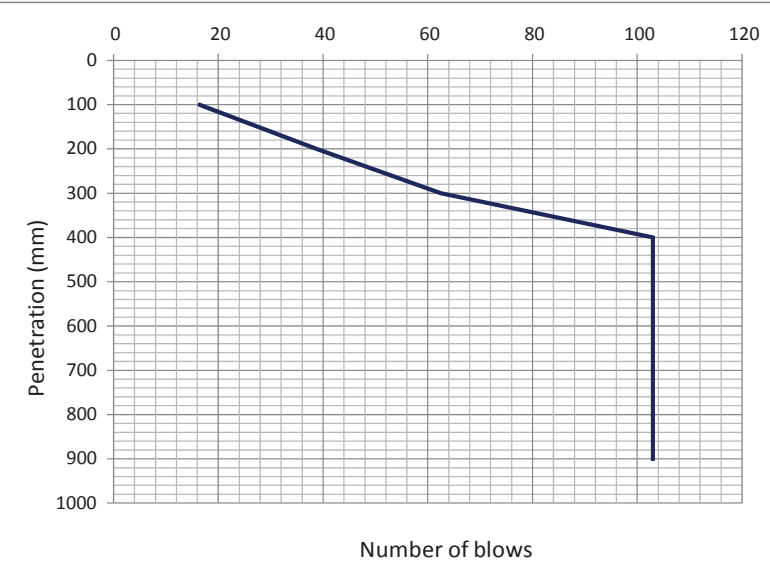
Chainage : 175+500 RHS					
Test No.	DCPT -25	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	810907.00	Y :	1778906.00
		Exposed Base			
242	34	1			
250	35	1			
256	36	1			
263	37	1			
271	38	1			
280	39	1			
287	40	1			
295	41	1			
303	42	1			
311	43	1			
319	44	1			
327	45	1			
336	46	1			
343	47	1			
354	48	1			
367	49	1			
380	50	1			
395	51	1			
399	52	1			
401	53	1			
403	54	1			
403	55	1			
404	56	1			

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 175+500 RHS</b>				
Test No.	DCPT -25	KOTHAKOTA BYPASS KURNOOL	Date:	23.02.18
		<b>X :</b> 810907.00	<b>Y :</b> 1778906.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	16	16
200	39	22
300	63	24
400	103	41
500	103	0
600	103	0
700	103	0
800	103	0
900	103	0



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>3.883</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>64</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)					
Chainage : 180+500 RHS					
Test No.	DCPT -26	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	813244.00	Y :	1774428.00
		Exposed Base			
Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration			
6	1	1			
13	2	1			
19	3	1			
24	4	1			
37	5	1			
53	6	1			
64	7	1			
74	8	1			
84	9	1			
92	10	1			
100	11	1			
105	12	1			
110	13	1			
120	14	1			
124	15	1	<p>as per Road Note 31</p> <p>Rate of Settlement = 10.229 mm/blow</p> <p>CBR = 22 %</p>		
129	16	1			
134	17	1			
140	18	1			
146	19	1			
152	20	1			
157	21	1			
163	22	1			
170	23	1			
180	24	1			
186	25	1			
196	26	1			
209	27	1			
219	28	1			
231	29	1			
245	30	1			
253	31	1			
261	32	1			
271	33	1			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 180+500 RHS					
Test No.	DCPT -26	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 23.02.18
		X :	813244.00	Y :	1774428.00
		Exposed Base			
279	34	1			
283	35	1			
285	36	1			
290	37	1			
293	38	1			
300	39	1			
302	40	1			
306	41	1			
310	42	1			
315	43	1			
320	44	1			
324	45	1			
330	46	1			
340	47	1			
350	48	1			
361	49	1			
376	50	1			
389	51	1			
402	52	1			
412	53	1			
420	54	1			
430	55	1			
440	56	1			
450	57	1			
461	58	1			
466	59	1			
474	60	1			
482	61	1			
490	62	1			
496	63	1			
505	64	1			
512	65	1			
523	66	1			
535	67	1			
550	68	1			
565	69	1			
580	70	1			
592	71	1			
605	72	1			
623	73	1			
638	74	1			
656	75	1			
679	76	1			
698	77	1			
723	78	1			
749	79	1			
774	80	1			
797	81	1			
826	82	1			
849	83	1			

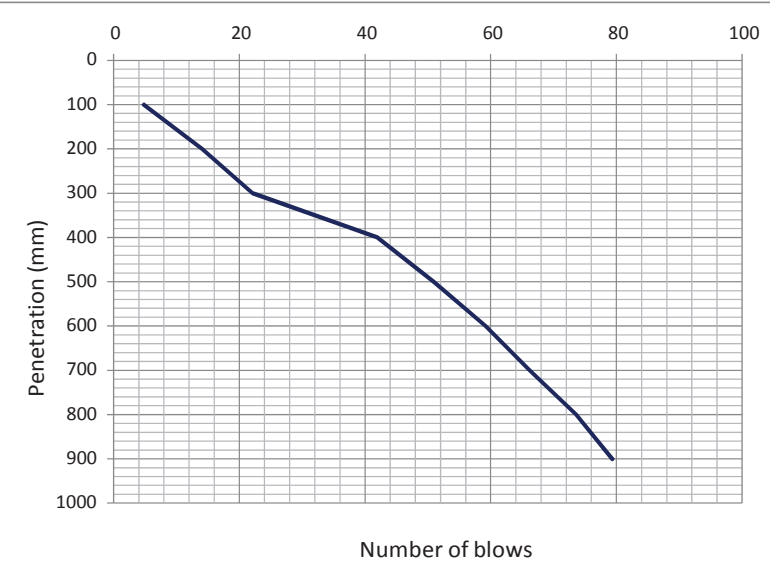


<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 180+500 RHS</b>				
Test No.	DCPT -26	KOTHAKOTA BYPASS KURNOOL	Date:	23.02.18
		<b>X :</b> 813244.00	<b>Y :</b> 1774428.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	5	5
200	14	9
300	22	8
400	42	20
500	51	9
600	59	8
700	66	7
800	74	7
900	79	6



**as per Road Note 31**

<b>Rate of Settlement</b>	=	<b>11.339</b>	<b>mm/blow</b>
<b>CBR</b>	=	<b>19</b>	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)						
Chainage : 195+200 RHS						
Test No.	DCPT -27	Location :	KOTHAKOTA BYPASS KURNOOL		Date:	22.02.18
		X :	180994.00	Y :	1764303.00	Exposed Base
Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration	<p>as per Road Note 31</p> <p>Rate of Settlement = 3.136 mm/blow</p> <p>CBR = 81 %</p>			
8	1	1				
9	2	1				
12	3	1				
21	4	1				
23	5	1				
26	6	1				
28	7	1				
31	8	1				
32	9	1				
38	10	1				
38	11	1				
40	12	1				
48	13	1				
59	14	1				
61	15	1				
67	16	1				
73	17	1				
80	18	1				
88	19	1				
94	20	1				
98	21	1				
108	22	1				
112	23	1				
117	24	1				
124	25	1				
132	26	1				
138	27	1				
141	28	1				
144	29	1				
149	30	1				
149	31	1				
152	32	1				
156	33	1				

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 195+200 RHS					
Test No.	DCPT -27	Location :	KOTHAKOTA BYPASS KURNOOL		Date: 22.02.18
		X :	180994.00	Y :	1764303.00
		Exposed Base			
158	34	1			
161	35	1			
164	36	1			
168	37	1			
171	38	1			
174	39	1			
178	40	1			
184	41	1			
184	42	1			
186	43	1			
189	44	1			
192	45	1			
193	46	1			
194	47	1			
198	48	1			
198	49	1			
199	50	1			
200	51	1			
201	52	1			
202	53	1			
204	54	1			
206	55	1			
208	56	1			
209	57	1			
210	58	1			
211	59	1			
213	60	1			
213	61	1			
214	62	1			
216	63	1			
218	64	1			
219	65	1			
219	66	1			
224	67	1			
224	68	1			
225	69	1			
229	70	1			
230	71	1			
233	72	1			
234	73	1			
236	74	1			
238	75	1			
241	76	1			
244	77	1			
246	78	1			
250	79	1			
252	80	1			
254	81	1			

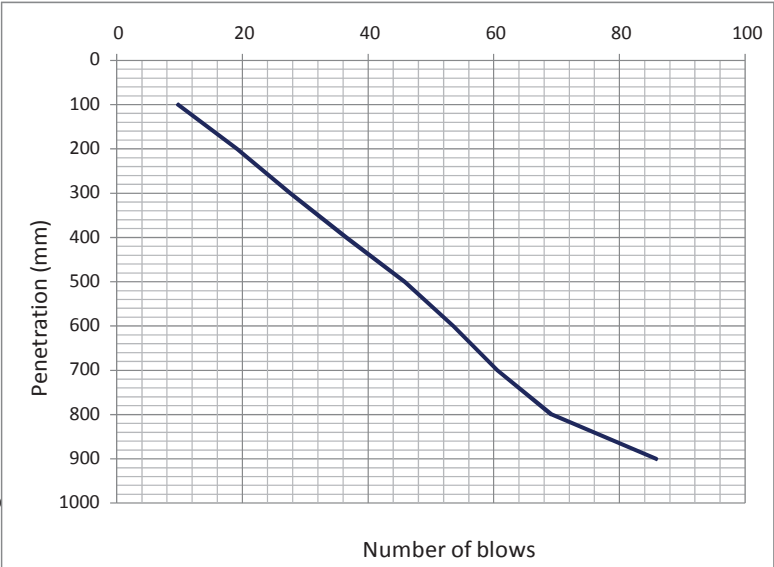
<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>												
<b>Chainage : 195+200 RHS</b>												
Test No.	DCPT -27	KOTHAKOTA BYPASS KURNOOL	Date:	22.02.18								
		X : 180994.00	Y : 1764303.00	Subgrade Base								
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<b>No. of blows per 10 cm penetration</b>										
100	15	15										
200	35	21										
300	53	18										
400	70	17										
500	100	30										
600	100	0										
700	100	0										
800	100	0										
900	100	0			<b>as per Road Note 31</b> <table style="margin: auto;"> <tr> <td style="text-align: right;">Rate of Settlement</td> <td style="text-align: center;">=</td> <td style="text-align: center;">9.000</td> <td style="text-align: left;">mm/blow</td> </tr> <tr> <td style="text-align: right;">CBR</td> <td style="text-align: center;">=</td> <td style="text-align: center;">25</td> <td style="text-align: left;">%</td> </tr> </table>		Rate of Settlement	=	9.000	mm/blow	CBR	=
Rate of Settlement	=	9.000	mm/blow									
CBR	=	25	%									

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 163+350 LHS				
Test No.	DCPT -28	KOTHAKOTA BYPASS KURNOOL		Date: 28.02.18
	X :	813010.00	Y : 1788565.00	Exposed Base
Depth (mm)	Cumulative No. of blows	<p>as per Road Note 31</p> <p>Rate of Settlement = 3.841 mm/blow</p> <p>CBR = 65 %</p>		
4	1			
8	2			
11	3			
14	4			
17	5			
21	6			
24	7			
27	8			
31	9			
34	10			
38	11			
41	12			
46	13			
52	14			
55	15			
59	16			
63	17			
67	18			
71	19			
74	20			
79	21			
81	22			
86	23			
91	24			
96	25			
101	26			
105	27			
109	28			
114	29			
120	30			
126	31			
132	32			
137	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 163+350 LHS					
Test No.	DCPT -28	KOTHAKOTA BYPASS KURNOOL		Date:	28.02.18
	<b>X :</b>	813010.00	<b>Y :</b>	1788565.00	Exposed Base
141	34				
145	35				
150	36				
155	37				
159	38				
164	39				
170	40				
176	41				
179	42				
182	43				
187	44				
190	45				
194	46				
199	47				
203	48				
208	49				
212	50				
216	51				
220	52				
224	53				
228	54				
233	55				
239	56				
244	57				
250	58				
255	59				
260	60				
265	61				
270	62				
275	63				
279	64				
282	65				
284	66				
287	67				
288	68				
289	69				
291	70				
293	71				
295	72				
296	73				
297	74				
302	75				
304	76				
308	77				
309	78				
310	79				
312	80				
312	81				
315	82				

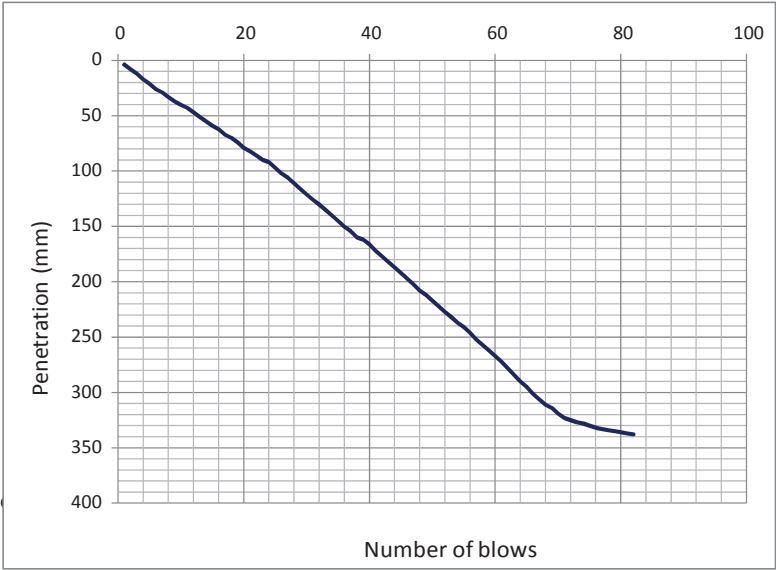
<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 163+350 LHS</b>				
Test No.	DCPT -28	KOTHAKOTA BYPASS KURNOOL		Date: 28.02.18
		X : 813010.00	Y : 1788565.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>			
100	10			
200	19			
300	28			
400	37			
500	46			
600	54			
700	61			
800	69			
900	86			



**as per Road Note 31**

**Rate of Settlement**                      =            **10.485**            **mm/blow**

**CBR**    =            **21**                      **%**

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 160+500 RHS				
Test No.	DCPT -29	KOTHAKOTA BYPASS KURNOOL		Date: 28.02.18
	X :	815604.00	Y : 1789753.00	Exposed Base
Depth (mm)	Cumulative No. of blows			
4	1			
8	2			
12	3			
17	4			
21	5			
26	6			
29	7			
33	8			
37	9			
40	10			
43	11			
47	12			
51	13			
55	14	<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement = 4.122 mm/blow</b></p> <p><b>CBR = 60 %</b></p>		
59	15			
62	16			
67	17			
70	18			
74	19			
79	20			
82	21			
86	22			
90	23			
92	24			
97	25			
102	26			
106	27			
111	28			
116	29			
121	30			
126	31			
130	32			
135	33			



Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch


Chainage : 160+500 RHS					
Test No.	DCPT -29	KOTHAKOTA BYPASS KURNOOL		Date:	28.02.18
	<b>X :</b>	815604.00	<b>Y :</b>	1789753.00	Exposed Base
140	34				
145	35				
150	36				
154	37				
160	38				
162	39				
166	40				
172	41				
177	42				
182	43				
187	44				
192	45				
197	46				
202	47				
208	48				
212	49				
217	50				
222	51				
227	52				
232	53				
237	54				
241	55				
246	56				
252	57				
257	58				
262	59				
267	60				
272	61				
278	62				
284	63				
290	64				
295	65				
301	66				
306	67				
311	68				
314	69				
319	70				
323	71				
325	72				
327	73				
328	74				
330	75				
332	76				
333	77				
334	78				
335	79				
336	80				
337	81				
338	82				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 160+500 RHS</b>				
Test No.	DCPT -29	KOTHAKOTA BYPASS KURNOOL	Date:	28.02.18
		<b>X :</b> 815604.00	<b>Y :</b> 1789753.00	Subgrade Base

Depth (mm)	Cumulative No. of blows	No. of blows per 10 cm penetration
100	61	61
200	61	0
300	61	0
400	61	0
500	60	0
600	60	0
700	60	0
800	60	0
900	60	0



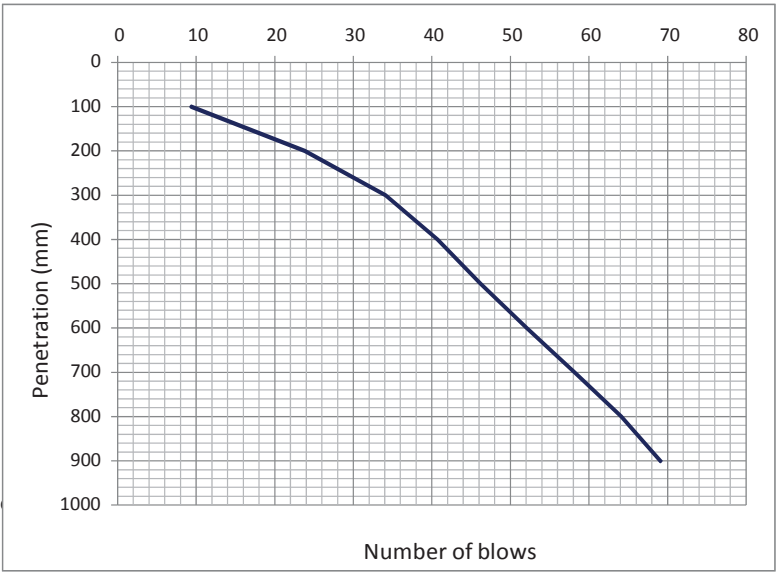
**as per Road Note 31**

<b>Rate of Settlement</b>	=	NA	<b>mm/blow</b>
<b>CBR</b>	=	NA	<b>%</b>

DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I & II)				
Chainage : 165+400 RHS				
Test No.	DCPT -30	KOTHAKOTA BYPASS KURNOOL		Date: 28.02.18
	X :	81187.00	Y : 1787618.00	Exposed Base
Depth (mm)	Cumulative No. of blows	<p>as per Road Note 31</p> <p>Rate of Settlement = 4.543 mm/blow</p> <p>CBR = 54 %</p>		
8	1			
13	2			
20	3			
25	4			
27	5			
29	6			
33	7			
35	8			
37	9			
41	10			
45	11			
50	12			
57	13			
63	14			
69	15			
75	16			
83	17			
91	18			
97	19			
103	20			
107	21			
112	22			
118	23			
124	24			
127	25			
134	26			
142	27			
149	28			
153	29			
155	30			
155	31			
156	32			
157	33			

Quality Control Test, Survey Investigation Material Testing for Preparation of  
a Report on Physical Condition of the KothaKota Bypass-Kurnool Stretch

Chainage : 165+400 RHS					
Test No.	DCPT -30	KOTHAKOTA BYPASS KURNOOL		Date:	28.02.18
	X :	81187.00	Y :	1787618.00	Exposed Base
158	34				
159	35				

<b>DYNAMIC CONE PENETRATION TEST (IS 4968 : Part I &amp; II)</b>				
<b>Chainage : 165+400 RHS</b>				
Test No.	DCPT -30	KOTHAKOTA BYPASS KURNOOL	Date:	28.02.18
		<b>X :</b> 81187.00	<b>Y :</b> 1787618.00	Subgrade Base
<b>Depth (mm)</b>	<b>Cumulative No. of blows</b>	<b>No. of blows per 10 cm penetration</b>		
100	9	9		
200	24	14		
300	34	10		
400	41	7		
500	46	5		
600	52	6		
700	58	6		
800	64	6		
900	69	5		
<p><b>as per Road Note 31</b></p> <p><b>Rate of Settlement</b>                      =              <b>13.025</b>              <b>mm/blow</b></p> <p><b>CBR</b>    =              <b>16</b>                      <b>%</b></p>				

### **ANNEXURE 3 LABORATORY INVESTIGATION**

S. No.	Chainage	Direction	Test Pit No.	Coordinates	
				X	Y
1	136+600	RHS	1	814821.00	1810201.00
2	138+100	LHS	2	815092.00	1808776.00
3	140+500	RHS	3	815333.00	1806322.00
4	143+000	LHS	4	815727.00	1803877.00
5	145+500	RHS	5	815852.00	1801401.00
6	148+000	LHS	6	816320.00	1798885.00
7	153+100	LHS	7	818909.00	1794955.00
8	150+300	RHS	8	816872.00	1796823.00
9	155+500	RHS	9	819089.00	1792571.00
10	158+000	LHS	10	817822.00	1790618.00
11	188+00	LHS	11	815593.00	1769870.00
12	198+100	LHS	12	180770.00	1761355.00
13	205+100	LHS	13	179210.00	1754655.00
14	207+500	LHS	14	180441.00	1752746.00
15	209+200	LHS	15	181278.00	1751083.00
16	178+000	LHS	16	812096.00	1776672.00
17	168+000	LHS	17	809418.00	1788711.00
18	170+500	RHS	18	.	.
19	200+200	RHS	19	180566.00	1759298.00
20	190+500	RHS	20	820472.00	1767755.00
21	183+000	LHS	21	814658.00	1772435.00
22	185+500	RHS	22	816601.00	1770871.00
23	193+000	LHS	23	180994.00	1764303.00
24	173+000	LHS	24	809755.00	1781103.00
25	175+500	RHS	25	810907.00	1778906.00
26	180+500	RHS	26	813244.00	1774428.00
27	195+200	RHS	27	180994.00	1764303.00
28	163+350	LHS	28	813010.00	1788565.00
29	160+500	RHS	29	815604.00	1789753.00
30	165+400	RHS	30	811187.00	1787618.00

Table 1. Test Pits Locations

ANNEXURE - I																							
TEST RESULTS OF SOIL LAYER																							
Location:: KothaKota Bypass-Kurnool NH-44																							
S. No.	CHAINAGE	Side	Soil Description	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			FSI [IS :2720- Pt-XXXX]	Modified Proctor Test (IS:2720-Pt-VIII)		SOAKED CBR AT 3 ENERGY LEVEL			UNSOAKED CBR AT 3 ENERGY LEVEL		
					19 mm	10 mm	4.75 mm	2.0 mm	425 micron	75 micron		Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)		Max. dry density (gm/cc)	OMC (%)	15 No. Of Blows	35 No. Of Blows	65 No. Of Blows	15 No. Of Blows	35 No. Of Blows	65 No. Of Blows
1	136+600	RHS	Clayey Sand	SC	0.00	3.10	11.20	8.10	18.80	21.00	37.80	24	16	8	NIL	2.03	9.5	4	7	19	8	13	26
2	138+100	LHS	Clayey Sand	SC	0.00	16.70	8.60	9.20	13.40	7.40	44.70	31	19	12	9	2.02	9.0	3	8	15	10	15	24
3	140+500	RHS	Clayey Gravel	GC	0.00	11.90	20.50	7.30	14.00	6.10	40.20	29	20	9	NIL	2.03	9.5	3	7	14	8	13	23
4	143+000	LHS	Clayey Sand	SC	0.00	12.90	6.40	9.50	19.40	11.30	40.50	25	16	9	NIL	2.05	8.5	7	10	17	15	19	31
5	145+500	RHS	Silty Sand	SM	0.00	6.50	8.30	8.00	38.30	22.50	16.40	23	NIL	NP	NIL	2.03	8.0	7	10	20	17	33	33
6	148+000	LHS	Clayey Sand	SC	0.00	6.80	8.90	9.90	17.30	15.00	42.10	27	17	10	NIL	2.07	8.0	6	8	15	11	26	37
7	150+300	RHS	Clayey Sand	SC	0.00	3.90	10.10	10.20	15.90	18.90	41.00	28	18	10	NIL	2.05	8.5	5	9	14	13	20	34
8	153+100	LHS	Silty Sand	SM	17.60	1.90	5.30	7.30	26.30	17.80	23.80	24	NIL	NP	NIL	2.08	7.5	5	9	17	12	22	36
9	155+500	RHS	Silty Sand	SM	13.70	3.30	6.90	8.20	31.70	14.90	21.30	25	NIL	NP	NIL	2.08	8.5	6	10	15	13	20	33
10	158+000	LHS	Clayey Sand	SC	0.00	5.90	8.20	7.90	24.60	11.40	42.00	30	17	13	NIL	2.07	8.0	5	7	13	11	17	37
11	160+500	RHS	Clayey Sand	SC	0.00	7.50	8.50	7.20	27.70	16.30	32.80	28	20	8	NIL	2.00	9.5	5	8	14	10	18	34
12	163+350	LHS	Clayey Sand	SC	0.00	6.80	8.40	10.60	21.60	18.80	33.80	25	17	8	NIL	2.01	9.0	4	7	12	9	19	28
13	165+400	RHS	Clayey Sand	SC	0.00	1.40	7.50	5.50	24.40	25.10	36.10	29	20	9	NIL	2.05	8.5	5	8	13	10	21	33
14	168+000	LHS	Silty Sand	SM	0.00	2.80	7.40	18.10	34.50	14.50	22.70	23	NIL	NP	NIL	2.06	8.5	4	8	15	11	24	39
15	170+500	RHS	Clayey Sand	SC	0.00	6.50	11.70	11.30	14.30	8.80	47.40	28	18	10	NIL	2.06	8.0	4	7	13	10	19	33
16	173+000	LHS	Silty Sand with Clay	SM-SC	0.00	8.60	7.80	9.90	27.30	12.20	34.20	24	17	7	NIL	2.07	8.0	5	8	15	12	28	40
17	175+500	RHS	Silty Sand with Clay	SM-SC	0.00	0.90	5.90	14.60	31.00	14.50	33.10	27	20	7	NIL	2.05	8.0	6	9	15	11	23	38
18	178+000	LHS	Silty Sand with Clay	SM-SC	0.00	3.70	6.70	13.10	26.30	18.80	31.40	25	19	7	NIL	2.04	8.0	5	9	14	13	22	37
19	180+500	RHS	Clayey Sand	SC	0.00	6.60	8.60	11.20	27.90	14.50	31.20	29	20	9	NIL	2.06	8.5	4	7	13	8	20	32
20	183+000	LHS	Silty Sand with Clay	SM-SC	0.00	8.20	12.90	11.40	26.40	15.40	25.70	26	20	6	NIL	2.03	8.5	4	8	15	11	19	35
21	185+500	RHS	Clayey Sand	SC	0.00	10.90	8.50	8.30	22.40	12.50	37.40	31	18	13	9	2.00	11.0	4	7	11	8	12	17
22	188+000	LHS	Clayey Sand	SC	0.00	2.70	12.80	7.80	16.00	11.70	49.00	33	18	15	12	2.01	10.0	3	7	9	5	10	15
23	190+500	RHS	Clayey Sand	SC	0.00	8.20	11.50	10.00	12.80	19.80	37.70	28	19	9	6	2.00	9.5	4	8	10	6	11	15
24	193+000	LHS	Clayey Sand	SC	0.00	5.90	6.70	6.30	21.50	13.70	45.90	30	17	13	10	1.99	9.5	5	8	13	5	12	20
25	195+200	RHS	Clayey Sand	SC	0.00	8.40	12.70	8.90	8.40	16.50	45.10	31	20	11	NIL	2.04	9.0	4	6	10	7	11	18



TEST RESULTS OF SOIL LAYER																							
Location:: KothaKota Bypass-Kurnool NH-44																							
S. No.	CHAINAGE	Side	Soil Description	IS Classification	Gradation: Percent by weight retained on the Sieve (IS:2720-IV)						Clay & silt content %	Atterberg Limits [IS :2720-Pt-V]			FSI [IS :2720-Pt-XXXX]	Modified Proctor Test (IS:2720-Pt-VIII)		SOAKED CBR AT 3 ENERGY LEVEL			UNSOAKED CBR AT 3 ENERGY LEVEL		
					19 mm	10 mm	4.75 mm	2.0 mm	425 micron	75 micron		Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI)		Max. dry density (gm/cc)	OMC (%)	15 No. Of Blows	35 No. Of Blows	65 No. Of Blows	15 No. Of Blows	35 No. Of Blows	65 No. Of Blows
26	198+000	LHS	Clayey Sand	SC	0.00	7.70	11.60	9.00	15.40	10.80	45.50	32	18	14	10	2.06	8.0	5	9	15	11	21	24
27	200+200	RHS	Clayey Sand	SC	0.00	3.50	11.00	7.00	18.40	11.20	48.90	34	19	15	13	1.98	8.5	4	8	9	8	16	18
28	205+100	LHS	Clayey Sand	SC	0.00	10.70	15.60	8.90	15.60	11.60	37.60	30	19	11	6	2.00	8.0	4	8	8	6	14	20
29	207+500	RHS	Clayey Sand	SC	0.00	12.20	8.90	9.90	12.80	14.50	41.70	30	19	12	8	2.01	8.0	4	8	11	9	15	24
30	209+200	LHS	Clayey Sand	SC	5.30	14.50	9.50	6.00	14.80	13.30	36.60	29	18	11	10	2.00	9.0	4	7	8	8	13	20

ANNEXURE - II																			
TEST RESULT OF GRANULAR SUB-BASE MATERIAL																			
Loaction:: KothaKota Bypass-Kurnool NH-44																			
Sl. No.	Location / Name of Quarry	Side	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		CBR Value at 98% dry density (Soaked)%	Specific Gravity	W.A. (%)	Impact Value (%)
			75 mm	53 mm	26.5 mm	9.5 mm	4.75 mm	2.36 mm	425 micron	75 micron	Liquid Limit	Plastic Limit (PL)	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %				
1	136+600	RHS	100.00	100.00	88.56	66.26	59.78	43.23	13.38	2.22	23.00	NIL	NP	2.21	7.00	33.00	2.68	0.73	26.00
2	138+100	LHS	100.00	97.88	64.17	40.26	26.10	20.32	11.60	1.52	22.00	NIL	NP	2.22	6.50	36.00	2.70	0.75	25.00
3	140+500	RHS	100.00	95.37	64.39	38.84	27.19	22.84	13.38	2.08	22.00	NIL	NP	2.22	6.50	37.00	2.69	0.75	25.00
4	143+000	LHS	100.00	96.67	60.79	42.29	28.81	27.56	11.87	1.82	22.00	NIL	NP	2.21	7.50	36.00	2.68	0.77	26.00
5	145+500	RHS	100.00	89.96	58.82	39.97	30.17	28.47	10.55	2.64	23.00	NIL	NP	2.23	6.50	39.00	2.70	0.75	24.00
6	148+000	LHS	100.00	100.00	64.18	49.87	44.19	31.09	13.36	2.12	22.00	NIL	NP	2.22	6.50	38.00	2.70	0.74	24.00
7	150+300	RHS	100.00	93.54	64.81	36.58	37.14	22.02	11.40	1.69	23.00	NIL	NP	2.21	7.00	35.00	2.67	0.79	28.00
8	153+100	LHS	100.00	98.24	78.54	55.97	44.68	33.54	12.20	2.28	23.00	NIL	NP	2.22	6.50	36.00	2.67	0.77	27.00
9	155+500	RHS	100.00	100.00	89.59	71.23	57.71	45.12	14.14	3.36	23.00	NIL	NP	2.24	6.00	37.00	2.67	0.76	26.00
10	158+000	LHS	100.00	95.14	66.51	42.15	36.14	36.61	13.58	2.27	24.00	20.00	4.00	2.21	7.50	33.00	2.66	0.79	29.00
11	160+500	RHS	100.00	96.66	63.87	39.91	28.82	23.39	13.41	3.68	23.00	NIL	NP	2.22	7.00	32.00	2.66	0.78	28.00
12	163+350	LHS	100.00	98.59	69.15	40.22	26.61	33.28	12.28	4.12	23.00	NIL	NP	2.23	6.50	37.00	2.69	0.79	28.00
13	165+400	RHS	100.00	100.00	65.10	41.18	25.18	31.17	14.45	2.28	23.00	NIL	NP	2.23	6.50	36.00	2.68	0.78	27.00

Loaction:: KothaKota Bypass-Kurnool NH-44																			
Sl. No.	Location / Name of Quarry	Side	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		CBR Value at 98% dry density (Soaked)%	Specific Gravity	W.A. (%)	Impact Value (%)
			75 mm	53 mm	26.5 mm	9.5 mm	4.75 mm	2.36 mm	425 micron	75 micron	Liquid Limit	Plastic Limit (PL)	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %				
14	168+000	LHS	100.00	100.00	67.19	39.99	27.14	32.28	13.33	3.36	23.00	NIL	NP	2.22	7.00	34.00	2.67	0.79	29.00
15	170+500	RHS	100.00	97.71	62.17	44.71	30.28	29.75	12.57	2.18	24.00	19.00	5.00	2.23	6.00	38.00	2.70	0.75	25.00
16	173+000	LHS	100.00	95.25	59.78	43.33	29.97	25.14	12.20	2.54	22.00	NIL	NP	2.22	7.00	34.00	2.67	0.78	28.00
17	175+500	RHS	100.00	96.61	60.28	45.59	30.76	26.66	13.68	3.39	22.00	NIL	NP	2.24	6.50	40.00	2.70	0.75	27.00
18	178+000	LHS	100.00	100.00	62.28	41.18	28.96	30.19	13.38	2.22	22.00	NIL	NP	2.24	6.50	41.00	2.70	0.76	26.00
19	180+500	RHS	100.00	100.00	64.83	46.61	30.78	28.80	12.22	2.19	23.00	NIL	NP	2.22	7.00	34.00	2.67	0.79	27.00
20	183+000	LHS	100.00	98.75	64.41	48.75	29.98	26.67	11.46	3.38	23.00	NIL	NP	2.23	7.00	34.00	2.68	0.77	27.00
21	185+500	RHS	100.00	96.16	58.82	40.26	28.15	22.41	10.78	3.36	23.00	NIL	NP	2.21	7.50	32.00	2.66	0.79	28.00
22	188+000	LHS	100.00	100.00	69.94	49.95	38.45	33.11	14.06	2.85	23.00	NIL	NP	2.22	7.00	36.00	2.69	0.77	27.00
23	190+500	RHS	100.00	100.00	72.85	37.69	25.58	26.64	13.30	2.14	22.00	NIL	NP	2.23	6.50	39.00	2.68	0.76	28.00
24	193+000	LHS	100.00	97.45	74.19	44.82	29.96	23.37	11.52	2.07	22.00	NIL	NP	2.24	6.00	36.00	2.66	0.79	27.00
25	195+200	RHS	100.00	100.00	82.67	49.78	34.84	28.78	14.69	2.28	22.00	NIL	NP	2.24	6.00	40.00	2.70	0.76	25.00
26	198+100	LHS	100.00	98.48	77.49	50.27	33.18	25.51	13.30	3.61	22.00	NIL	NP	2.23	6.50	35.00	2.68	0.79	28.00
27	200+200	RHS	100.00	100.00	80.21	44.69	36.69	38.82	13.10	1.82	22.00	NIL	NP	2.24	6.00	40.00	2.70	0.78	26.00

Loaction:: KothaKota Bypass-Kurnool NH-44																			
Sl. No.	Location / Name of Quarry	Side	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		CBR Value at 98% dry density (Soaked)%	Specific Gravity	W.A. (%)	Impact Value (%)
			75 mm	53 mm	26.5 mm	9.5 mm	4.75 mm	2.36 mm	425 micron	75 micron	Liquid Limit	Plastic Limit (PL)	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %				
28	205+100	LHS	100.00	100.00	85.59	42.67	34.19	28.49	11.87	2.37	23.00	NIL	NP	2.22	7.50	33.00	2.66	0.80	29.00
29	207+500	RHS	100.00	100.00	92.41	40.28	36.94	25.14	10.55	1.54	24.00	NIL	NP	2.23	7.00	37.00	2.68	0.77	26.00
30	209+200	LHS	100.00	97.58	79.58	38.48	31.00	27.19	11.87	2.58	23.00	NIL	NP	2.22	7.00	32.00	2.65	0.81	28.00

ANNEXURE - III																		
TEST RESULT OF WET MIX MACADAM																		
Loaction:: KothaKota Bypass-Kurnool NH-44																		
Sl. No.	Location / Name of Quarry	SIDE	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		Specific Gravity	W.A. (%)	IMPACT(%)
			53 mm	45 mm	22.4 mm	11.2 mm	4.75 mm	2.36 mm	600 micron	75 micron	Liquid Limit	Plastic Limit	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %			
1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	19	20	21
1	136+600	RHS	100.00	98.04	63.84	53.46	39.03	29.14	19.82	1.18	23.00	NP	NIL	2.29	5.50	2.66	0.78	24.00
2	138+100	LHS	100.00	98.10	65.96	52.48	38.98	28.34	20.21	1.23	22.00	NP	NIL	2.30	5.00	2.65	0.82	24.00
3	140+500	RHS	100.00	97.81	64.84	54.41	37.82	28.94	19.64	1.47	22.00	NP	NIL	2.28	5.50	2.66	0.77	25.00
4	143+000	LHS	100.00	98.06	65.63	55.31	38.26	29.10	20.08	1.38	23.00	NP	NIL	2.29	5.00	2.64	0.87	24.00
5	145+500	RHS	100.00	96.28	64.54	54.61	36.47	28.91	19.64	1.16	22.00	NP	NIL	2.29	5.00	2.64	0.84	24.00
6	148+000	LHS	100.00	96.58	65.23	53.64	38.62	29.40	18.62	1.38	22.00	NP	NIL	2.27	5.50	2.65	0.80	23.00
7	150+300	RHS	100.00	97.87	66.23	55.31	38.21	29.84	19.84	1.41	23.00	NP	NIL	2.27	5.50	2.66	0.78	24.00
8	153+100	LHS	100.00	98.24	69.46	54.21	36.64	26.24	16.61	1.64	23.00	NP	NIL	2.28	5.50	2.67	0.76	23.00
9	155+500	RHS	100.00	97.41	68.43	55.26	33.94	27.41	18.84	2.08	22.00	NP	NIL	2.28	5.50	2.66	0.82	24.00
10	158+000	LHS	100.00	96.61	67.36	50.64	35.38	28.22	16.34	1.84	23.00	NP	NIL	2.27	6.00	2.67	0.76	24.00
11	160+500	RHS	100.00	97.52	70.14	48.97	36.38	29.08	17.04	1.64	24.00	NP	NIL	2.27	6.00	2.67	0.78	23.00
12	163+350	LHS	100.00	98.10	69.41	49.02	35.45	27.46	18.10	1.82	24.00	NP	NIL	2.29	5.00	2.66	0.81	24.00

Loaction:: KothaKota Bypass-Kurnool NH-44																		
Sl. No.	Location / Name of Quarry	SIDE	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		Specific Gravity	W.A. (%)	IMPACT(%)
			53 mm	45 mm	22.4 mm	11.2 mm	4.75 mm	2.36 mm	600 micron	75 micron	Liquid Limit	Plastic Limit	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %			
13	165+400	RHS	100.00	96.45	68.56	52.10	37.89	28.21	16.21	1.43	24.00	NP	NIL	2.28	5.00	2.66	0.83	25.00
14	168+000	LHS	100.00	97.54	72.21	53.41	36.61	25.61	18.10	1.61	23.00	NP	NIL	2.29	5.00	2.65	0.84	25.00
15	170+500	RHS	100.00	98.26	73.24	51.61	37.04	24.82	17.45	1.65	23.00	NP	NIL	2.30	5.00	2.66	0.82	24.00
16	173+000	LHS	100.00	96.24	74.21	50.04	36.94	26.54	18.24	1.39	22.00	NP	NIL	2.30	5.00	2.68	0.71	24.00
17	175+500	RHS	100.00	97.24	72.01	49.61	35.09	27.41	19.08	1.54	23.00	NP	NIL	2.29	5.50	2.67	0.74	24.00
18	178+000	LHS	100.00	98.41	69.12	48.98	37.49	28.56	18.69	1.41	22.00	NP	NIL	2.29	5.50	2.67	0.75	25.00
19	180+500	RHS	100.00	97.34	69.46	48.56	38.10	26.65	16.21	1.84	22.00	NP	NIL	2.30	5.00	2.68	0.70	25.00
20	183+000	LHS	100.00	96.79	67.57	49.08	37.02	27.21	17.98	1.96	23.00	NP	NIL	2.30	5.00	2.66	0.81	25.00
21	185+500	RHS	100.00	97.84	66.64	53.01	35.22	24.61	15.09	2.13	24.00	NP	NIL	2.29	5.00	2.65	0.82	24.00
22	188+000	LHS	100.00	96.64	68.31	54.01	32.56	25.11	14.98	2.62	24.00	NP	NIL	2.29	5.00	2.65	0.87	24.00
23	190+500	RHS	100.00	96.97	64.21	54.98	34.04	26.41	15.32	2.21	23.00	NP	NIL	2.30	5.00	2.66	0.82	24.00
24	193+000	LHS	100.00	97.31	63.44	53.61	35.61	29.53	16.04	2.41	23.00	NP	NIL	2.30	5.00	2.66	0.80	25.00
25	195+200	RHS	100.00	98.10	65.51	55.08	37.13	27.80	17.81	2.11	23.00	NP	NIL	2.29	5.00	2.65	0.81	24.00
26	198+100	LHS	100.00	97.88	66.31	53.01	38.06	28.24	18.18	1.84	24.00	NP	NIL	2.29	5.00	2.66	0.83	25.00

Loaction:: KothaKota Bypass-Kurnool NH-44																		
Sl. No.	Location / Name of Quarry	SIDE	Gradation: Percent by weight passing the Sieve (Close graded) (MORTH)								Atterberg limits (IS:2720-Part V)			Modified Proctor Test (IS:2720-Part VIII)		Specific Gravity	W.A. (%)	IMPACT(%)
			53 mm	45 mm	22.4 mm	11.2 mm	4.75 mm	2.36 mm	600 micron	75 micron	Liquid Limit	Plastic Limit	Plasticity Index (PI)	Maximum Dry Density gm/cc	OMC %			
27	200+200	RHS	100.00	96.74	67.84	54.11	36.42	26.09	17.84	1.79	24.00	NP	NIL	2.30	5.00	2.67	0.79	24.00
28	205+100	LHS	100.00	97.31	69.45	53.94	35.51	25.81	18.04	1.81	23.00	NP	NIL	2.30	5.00	2.65	0.87	24.00
29	207+500	RHS	100.00	98.24	68.42	54.64	36.94	25.01	19.21	1.71	23.00	NP	NIL	2.28	5.50	2.64.	0.89	25.00
30	209+200	LHS	100.00	97.44	67.84	53.54	37.13	27.11	18.64	1.88	23.00	NP	NIL	2.29	5.50	2.65	0.86	24.00

Test Result for Bitumen Core and Dense Bitumen Macadam																								
Location :: KOTHAKOTA BYPASS-KURNOOL																								
S.No.	Chainage	Side	Density (gm/cc)	Binder Content (%)	Thickness (mm)	Bitumen Core - Gradation (% Passing)										Dense Bitumen Macadam - Gradation % Passing								
						26.5 mm	19 mm	13.2 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	0.6 mm	0.3 mm	0.15 mm	0.075 mm	37.5 mm	26.5 mm	19 mm	13.2 mm	4.75 mm	2.36 mm	0.3 mm	0.075 mm
1	135+500	RHS	2.403	4.66	81.83	100	95.14	60.13	55.47	40.3	32.1	22.56	20.14	14.35	7.62	3.14								
2	135+500	RHS	2.414	4.23	95.55												100	100	90.12	70.31	49.32	36.94	15.13	5.2
3	137+000	LHS	2.283	4.74	41.68	100	100	95.1	82.46	61.22	53.12	40.44	27.1	20.12	12.44	4.56								
4	137+000	LHS	2.358	4.45	116.45												100	100	88.3	76.44	51.1	40.3	18.14	6.64
5	141+500	LHS	2.393	4.61	51.88	100	95.64	62.17	60.2	42.58	36.1	25.14	21.22	15.6	8.44	3.58								
6	141+500	LHS	2.432	3.69	72.60												100	96.1	75.14	60.3	42.1	28.56	8.86	3.1
7	142+000	RHS	2.389	4.29	50.10	100	91.36	60.26	52.44	36.1	30.54	20.16	16.6	10.48	7.12	2.84								
8	142+000	RHS	2.444	3.70	160.30												100	97.1	76.48	62.54	45.12	30.2	10.64	5.46
9	147+000	LHS	2.395	4.67	81.15	100	93.45	64.53	62.32	44.1	37.1	25.48	22.16	17.2	9.42	3.7								
10	147+000	LHS	2.354	3.60	53.12												100	92.56	73.15	56.81	39.6	30.26	8.1	3.44
11	150+000	RHS	2.390	4.78	56.65	100	98.24	76.12	63.44	44.86	39.12	26.4	24.13	19.6	10.12	4.62								
12	150+000	RHS	2.436	3.80	156.25												100	99.1	75.48	60.34	44.22	33.1	13.56	4.16
13	152+000	LHS	2.324	5.10	36.19	100	100	100	85.1	68.11	48.31	40.16	30.12	22.4	14.26	5.46								
14	152+000	LHS	2.396	3.98	53.45												100	100	88.12	70.42	44.36	38.45	15.2	5.46
15	155+000	RHS	2.438	4.87	44.36	100	100	94.22	75.46	62.34	45.62	40.56	26.84	20.33	13.2	5								
16	155+000	RHS	2.370	3.83	113.85												100	100	76.14	59.12	42.32	31.2	13.62	2.48
17	158+000	LHS	2.379	4.31	95.90	100	90.12	60.1	55.12	35.62	29.16	20.48	18.47	10.26	6.48	2.84								
18	158+000	LHS	2.428	3.96	70.30												100	100	80.11	63.14	45.22	36.1	15.12	6.14
19	160+000	RHS	2.377	4.63	75.91	100	93.62	61.2	54.26	35.16	30.66	22.45	17.62	13.2	7.33	3.32								
20	160+000	RHS	2.474	4.10	61.82												100	100	84.62	65.1	47.12	37.24	16.32	6.8
21	163+600	LHS	2.305	4.44	39.45	100	91.22	60.12	54.52	36.11	28.12	21.22	17.42	10.36	5.62	2.11								
22	163+600	LHS	2.264	3.55	73.79												100	93.14	73.56	56.26	40.12	28.45	8.65	3.1
23	165+000	RHS	2.345	4.59	52.38	100	91.2	60.28	53.1	38.46	30.14	20.48	16.63	13.46	5.02	2.44								
24	165+000	RHS	2.381	3.78	72.35												100	95.64	79.56	60.22	40.55	30.1	13.46	4.11
25	168+000	LHS	2.257	4.34	39.06	100	90.46	61.02	52.22	32.03	28.4	20.78	16.1	10.36	4.22	2.03								
26	168+000	LHS	2.384	3.59	56.55												100	91.1	72.01	56.06	39.1	30.1	7.77	2.56
27	170+000	RHS	2.406	4.33	153.15	100	100	95.53	86.54	60.02	47.07	37.66	30.58	21.38	15.56	11.19								
28	170+000	RHS	2.389	4.38	66.98												100	100	91.32	73.62	41.26	31.08	12.39	3.91
29	172+000	LHS	2.373	4.78	45.20	100	100	82.54	75.59	53.59	44.82	34.69	25.81	15.56	11.17	8.71								
30	172+000	LHS	2.426	4.00	158.30												100	100	91.55	73.06	42.59	31	12.41	4.08
31	175+000	RHS	2.307	3.89	65.92	100	100	86.4	77.54	57.84	43.26	32.11	24.04	13.68	7.79	5.16								
32	175+000	RHS	2.310	3.66	109.22												100	100	92.57	72.25	44.58	32.29	12.44	4.27
33	178+000	LHS	2.326	4.61	39.73	100	100	81.24	70.56	55.48	38.84	31.58	25.48	12.85	7.17	5								
34	178+000	LHS	2.440	3.90	80.20												100	100	97.15	71.52	47.94	33.16	12.04	4.18
35	180+000	RHS	2.404	4.55	74.53	100	93.3	75.52	61.22	50.86	36.79	29.95	25.54	12.84	7.06	4.18								
36	180+000	RHS	2.408	4.00	71.94												100	100	97.28	72.52	51.22	36.37	12.28	4.81
37	183+000	LHS	2.327	4.87	56.75	100	95.58	77.82	62.49	49.89	38.81	30.11	20.27	13.63	5.27	2.44								
38	183+000	LHS	2.427	3.82	139.90												100	100	97.14	71.49	51.85	36.69	12.11	5.08
39	185+100	RHS	2.240	4.56	50.65	100	93.36	76.89	60.54	50.29	36.49	29.86	22.51	12.57	6.17	2.56								
40	185+100	RHS	2.328	3.33	126.26												100	100	98.11	72.64	51.14	35.59	12.07	5.17
41	190+000	LHS	2.354	4.20	113.25	100	94.15	77.94	59.05	51.22	39.72	31.2	18.1	10.59	5.28	2.04								
42	190+000	LHS	2.392	4.56	77.04												100	100	98.45	71.12	52.57	37.7	12.27	5.49
43	190+000	RHS	2.358	4.23	70.45	100	98.28	78.85	66.79	42.37	33.06	26.59	20.96	17.42	12.11	7.16								



11

Test Result for Bitumen Core and Dense Bitumen Macadam																								
Location :: KOTHAKOTA BYPASS-KURNOOL																								
S.No.	Chainage	Side	Density (gm/cc)	Binder Content (%)	Thickness (mm)	Bitumen Core - Gradation (% Passing)										Dense Bitumen Macadam - Gradation % Passing								
						26.5 mm	19 mm	13.2 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	0.6 mm	0.3 mm	0.15 mm	0.075 mm	37.5 mm	26.5 mm	19 mm	13.2 mm	4.75 mm	2.36 mm	0.3 mm	0.075 mm
44	190+000	RHS	2.422	3.54	74.22												100	100	96.74	74.49	50.28	35.12	12.3	4.87
45	195+000	RHS	2.355	4.60	81.33	100	90.55	76.83	68.92	45.95	33.44	24.07	16.74	6.79	0.33	0.06								
46	195+000	RHS	2.390	4.21	130.99												100	100	95.27	77.81	45.1	33.61	12.56	4.41
47	196+300	LHS	2.279	4.51	104.15	100	100	87.69	70.22	46.62	34.42	27.79	18	10.05	5.77	2.59								
48	196+300	LHS	2.328	3.74	72.75												100	100	94.54	83	45.12	33.71	12.52	2.54
49	200+000	RHS	2.289	3.84	43.44	100	100	90.61	76.7	48.96	35.29	33.5	18.26	10.21	5.09	2.11								
50	200+000	RHS	2.389	5.64	87.75												100	100	94.38	84.19	44.92	33.63	12.47	2.21
51	201+000	LHS	2.335	4.68	39.40	100	100	95.34	84.8	57.03	42.9	28.93	18.22	7.68	1.66	0.18								
52	201+000	LHS	2.406	4.20	127.22												100	100	92.76	83.46	44.67	33.18	12.66	2.57
53	205+000	RHS	2.324	4.13	81.37	100	100	90.66	78.11	50.3	37.61	29.25	22.34	13.79	7.67	4.3								
54	205+000	RHS	2.401	3.64	86.01												100	100	91.57	79	44.15	34.29	13.01	3.99
55	206+000	LHS	2.327	4.50	78.75	100	100	87.42	71.25	51.65	37.3	33.25	20.73	11.47	5.37	2.26								
56	206+000	LHS	2.385	3.74	82.12												100	100	88.61	77.31	45.96	34.5	12.93	4.23
57	209+900	LHS	2.324	4.33	74.35	100	100	84.36	72.66	51.85	38.49	31.18	21.98	12.78	5.29	2.05								
58	209+900	LHS	2.390	3.81	106.55												100	100	90.28	81.24	44.87	33.94	13.08	3.87
59	209+950	RHS	2.304	4.51	32.04	100	100	94.97	78.15	53.85	42.58	36.7	20.1	12.63	5.27	2.55								
60	209+950	RHS	2.380	3.93	106.90												100	100	89.87	79.95	45.82	34.79	13.52	4.11



Bibek Kumar Jha  
M.Tech.(Geotechnical Engineering)  
Authorized Signatory

#### ANNEXURE 4 DEFLECTIONS

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	135+500 LHS slowlane	11/2/2018	1	0.1922	0.1379	0.0803	0.0553	0.0404	0.0250	0.0210	26.2	40.4
7	135+500 LHS slowlane	11/2/2018	2	0.1924	0.1364	0.0827	0.0561	0.0432	0.0215	0.0201	26.2	40.4
7	135+500 LHS slowlane	11/2/2018	3	0.1961	0.1399	0.0838	0.0583	0.0398	0.0237	0.0216	26.2	40.4
7	135+750 LHS slowlane	11/2/2018	1	0.2011	0.1418	0.0869	0.0611	0.0455	0.0339	0.0268	26.2	40.4
7	135+750 LHS slowlane	11/2/2018	2	0.1969	0.1404	0.0863	0.0607	0.0459	0.0345	0.0281	26.2	40.4
7	135+750 LHS slowlane	11/2/2018	3	0.1936	0.1388	0.0858	0.0618	0.0460	0.0349	0.0276	26.2	40.4
7	136+000 LHS slowlane	11/2/2018	1	0.1556	0.1164	0.0739	0.0547	0.0331	0.0158	0.0215	26.2	40.4
7	136+000 LHS slowlane	11/2/2018	2	0.1552	0.1140	0.0713	0.0478	0.0354	0.0226	0.0229	26.2	40.4
7	136+000 LHS slowlane	11/2/2018	3	0.1573	0.1188	0.0732	0.0517	0.0346	0.0251	0.0241	26.2	40.4
7	136+250 LHS slowlane	11/2/2018	1	0.1374	0.0922	0.0565	0.0324	0.0291	0.0193	0.0154	26.2	40.4
7	136+250 LHS slowlane	11/2/2018	2	0.1355	0.0945	0.0575	0.0361	0.0285	0.0225	0.0165	26.3	40.4
7	136+250 LHS slowlane	11/2/2018	3	0.1321	0.0923	0.0580	0.0381	0.0278	0.0234	0.0175	26.3	40.4
7	136+500 LHS slowlane	11/2/2018	1	0.1264	0.0883	0.0519	0.0347	0.0238	0.0161	0.0138	26.3	40.4
7	136+500 LHS slowlane	11/2/2018	2	0.1264	0.0893	0.0537	0.0362	0.0257	0.0167	0.0144	26.3	40.4
7	136+500 LHS slowlane	11/2/2018	3	0.1259	0.0880	0.0525	0.0367	0.0241	0.0175	0.0123	26.3	40.4
7	136+750 LHS slowlane	11/2/2018	1	0.1572	0.1159	0.0690	0.0449	0.0313	0.0201	0.0101	26.3	40.4
7	136+750 LHS slowlane	11/2/2018	2	0.1482	0.1120	0.0706	0.0466	0.0314	0.0242	0.0148	26.2	40.4
7	136+750 LHS slowlane	11/2/2018	3	0.1537	0.1124	0.0714	0.0459	0.0304	0.0208	0.0035	26.3	40.4
7	137+000 LHS slowlane	11/2/2018	1	0.1738	0.1248	0.0684	0.0463	0.0343	0.0228	0.0187	26.4	40.4
7	137+000 LHS slowlane	11/2/2018	2	0.1731	0.1188	0.0661	0.0458	0.0335	0.0226	0.0215	26.4	40.4
7	137+000 LHS slowlane	11/2/2018	3	0.1690	0.1181	0.0696	0.0451	0.0366	0.0256	0.0185	26.4	40.4
7	137+250 LHS slowlane	11/2/2018	1	0.1494	0.1051	0.0657	0.0516	0.0398	0.0252	0.0208	26.5	40.4
7	137+250 LHS slowlane	11/2/2018	2	0.1477	0.1064	0.0659	0.0537	0.0397	0.0252	0.0210	26.5	40.4
7	137+250 LHS slowlane	11/2/2018	3	0.1487	0.1096	0.0691	0.0526	0.0403	0.0292	0.0212	26.5	40.4
7	137+500 LHS slowlane	11/2/2018	1	0.1638	0.1225	0.0778	0.0576	0.0348	0.0166	0.0226	26.6	40.4
7	137+500 LHS slowlane	11/2/2018	2	0.1634	0.1200	0.0751	0.0503	0.0373	0.0238	0.0241	26.6	40.4
7	137+500 LHS slowlane	11/2/2018	3	0.1656	0.1251	0.0770	0.0544	0.0364	0.0264	0.0254	26.6	40.4
7	137+750 LHS slowlane	11/2/2018	1	0.1778	0.1298	0.0777	0.0642	0.0651	0.0325	0.0162	26.6	40.4
7	137+750 LHS slowlane	11/2/2018	2	0.1757	0.1297	0.0757	0.0589	0.0666	0.0333	0.0166	26.6	40.4
7	137+750 LHS slowlane	11/2/2018	3	0.1758	0.1295	0.0783	0.0705	0.0858	0.0429	0.0214	26.6	40.4
7	138+000 LHS slowlane	11/2/2018	1	0.1437	0.1108	0.0708	0.0534	0.0363	0.0253	0.0207	26.6	40.4
7	138+000 LHS slowlane	11/2/2018	2	0.1414	0.1078	0.0692	0.0526	0.0355	0.0251	0.0215	26.6	40.4
7	138+000 LHS slowlane	11/2/2018	3	0.1419	0.1067	0.0727	0.0507	0.0362	0.0242	0.0187	26.6	40.4
7	138+250 LHS slowlane	11/2/2018	1	0.1102	0.0759	0.0466	0.0315	0.0212	0.0129	0.0123	26.7	40.4
7	138+250 LHS slowlane	11/2/2018	2	0.1057	0.0687	0.0493	0.0324	0.0191	0.0163	0.0255	26.7	40.4
7	138+250 LHS slowlane	11/2/2018	3	0.1046	0.0653	0.0471	0.0318	0.0203	0.0141	0.0070	26.7	40.4
7	138+500 LHS slowlane	11/2/2018	1	0.1991	0.1201	0.0704	0.0407	0.0341	0.0226	0.0204	26.6	40.4
7	138+500 LHS slowlane	11/2/2018	2	0.2002	0.1319	0.0724	0.0469	0.0345	0.0248	0.0226	26.6	40.4
7	138+500 LHS slowlane	11/2/2018	3	0.1917	0.1201	0.0634	0.0353	0.0337	0.0177	0.0259	26.6	40.4
7	138+750 LHS slowlane	11/2/2018	1	0.2857	0.1840	0.0937	0.0550	0.0430	0.0310	0.0257	26.4	40.4
7	138+750 LHS slowlane	11/2/2018	2	0.2716	0.1717	0.0874	0.0559	0.0400	0.0274	0.0252	26.4	40.4
7	138+750 LHS slowlane	11/2/2018	3	0.2696	0.1798	0.0903	0.0579	0.0425	0.0317	0.0236	26.4	40.4
7	139+000 LHS slowlane	11/2/2018	1	0.1446	0.0971	0.0595	0.0341	0.0306	0.0203	0.0162	26.4	40.4
7	139+000 LHS slowlane	11/2/2018	2	0.1426	0.0995	0.0605	0.0380	0.0300	0.0237	0.0174	26.4	40.4
7	139+000 LHS slowlane	11/2/2018	3	0.1390	0.0972	0.0611	0.0401	0.0293	0.0246	0.0184	26.4	40.4
7	139+250 LHS slowlane	11/2/2018	1	0.1608	0.1146	0.0687	0.0463	0.0350	0.0256	0.0179	26.2	40.4
7	139+250 LHS slowlane	11/2/2018	2	0.1553	0.1105	0.0693	0.0470	0.0312	0.0266	0.0168	26.2	40.4
7	139+250 LHS slowlane	11/2/2018	3	0.1566	0.1115	0.0737	0.0533	0.0376	0.0273	0.0174	26.2	40.4
7	139+500 LHS slowlane	11/2/2018	1	0.1545	0.1130	0.0704	0.0450	0.0315	0.0219	0.0185	26.1	40.4
7	139+500 LHS slowlane	11/2/2018	2	0.1575	0.1174	0.0712	0.0477	0.0346	0.0235	0.0189	26.1	40.4
7	139+500 LHS slowlane	11/2/2018	3	0.1556	0.1137	0.0693	0.0474	0.0335	0.0234	0.0192	26.1	40.4
7	139+750 LHS slowlane	11/2/2018	1	0.1304	0.0975	0.0644	0.0433	0.0329	0.0164	0.0082	26.1	40.4
7	139+750 LHS slowlane	11/2/2018	2	0.1357	0.1036	0.0680	0.0451	0.0354	0.0177	0.0088	26.2	40.4
7	139+750 LHS slowlane	11/2/2018	3	0.1327	0.1011	0.0689	0.0446	0.0348	0.0174	0.0087	26.2	40.4
7	140+000 LHS slowlane	11/2/2018	1	0.1384	0.1007	0.0657	0.0487	0.0314	0.0249	0.0230	26.2	40.4
7	140+000 LHS slowlane	11/2/2018	2	0.1334	0.1005	0.0644	0.0467	0.0314	0.0228	0.0239	26.2	40.4
7	140+000 LHS slowlane	11/2/2018	3	0.1314	0.1030	0.0614	0.0443	0.0321	0.0212	0.0248	26.2	40.4
7	140+250 LHS slowlane	11/2/2018	1	0.1617	0.1161	0.0653	0.0417	0.0288	0.0156	0.0135	26.2	40.4
7	140+250 LHS slowlane	11/2/2018	2	0.1621	0.1172	0.0673	0.0438	0.0297	0.0199	0.0159	26.2	40.4
7	140+250 LHS slowlane	11/2/2018	3	0.1618	0.1173	0.0677	0.0441	0.0307	0.0202	0.0160	26.3	40.4
7	140+500 LHS slowlane	11/2/2018	1	0.1437	0.1065	0.0679	0.0510	0.0326	0.0248	0.0190	26.4	40.4
7	140+500 LHS slowlane	11/2/2018	2	0.1461	0.1057	0.0684	0.0453	0.0355	0.0249	0.0195	26.4	40.4
7	140+500 LHS slowlane	11/2/2018	3	0.1433	0.1046	0.0683	0.0471	0.0352	0.0261	0.0198	26.4	40.4
7	140+750 LHS slowlane	11/2/2018	1	0.1850	0.1279	0.0688	0.0427	0.0273	0.0229	0.0197	26.5	40.4
7	140+750 LHS slowlane	11/2/2018	2	0.1840	0.1238	0.0669	0.0436	0.0298	0.0211	0.0193	26.4	40.4
7	140+750 LHS slowlane	11/2/2018	3	0.1804	0.1222	0.0638	0.0440	0.0322	0.0201	0.0124	26.5	40.4
7	141+000 LHS slowlane	11/2/2018	1	0.1655	0.1220	0.0726	0.0473	0.0329	0.0212	0.0106	26.5	40.4
7	141+000 LHS slowlane	11/2/2018	2	0.1560	0.1179	0.0743	0.0490	0.0330	0.0255	0.0156	26.5	40.4
7	141+000 LHS slowlane	11/2/2018	3	0.1618	0.1183	0.0752	0.0483	0.0320	0.0219	0.0037	26.5	40.4
7	141+250 LHS slowlane	11/2/2018	1	0.1809	0.1136	0.0620	0.0403	0.0228	0.0261	0.0092	26.4	40.4
7	141+250 LHS slowlane	11/2/2018	2	0.1807	0.1175	0.0573	0.0431	0.0250	0.0205	0.0102	26.4	40.4
7	141+250 LHS slowlane	11/2/2018	3	0.1821	0.1129	0.0624	0.0436	0.0256	0.0279	0.0204	26.4	40.4
7	141+500 LHS slowlane	11/2/2018	1	0.1491	0.1115	0.0665	0.0426	0.0213	0.0106	0.0053	26.5	40.4
7	141+500 LHS slowlane	11/2/2018	2	0.1599	0.1177	0.0701	0.0462	0.1496	0.0748	0.0374	26.5	40.4
7	141+500 LHS slowlane	11/2/2018	3	0.1577	0.1165	0.0676	0.0421	0.0990	0.0495	0.0247	26.4	40.4

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	141+750 LHS slowlane	11/2/2018	1	0.1496	0.1016	0.0609	0.0384	0.0222	0.0148	0.0215	26.4	40.4
7	141+750 LHS slowlane	11/2/2018	2	0.1487	0.1047	0.0589	0.0376	0.0250	0.0181	0.0133	26.4	40.4
7	141+750 LHS slowlane	11/2/2018	3	0.1464	0.1011	0.0569	0.0374	0.0250	0.0199	0.0173	26.4	40.4
7	142+000 LHS slowlane	11/2/2018	1	0.1364	0.0967	0.0554	0.0323	0.0191	0.0155	0.0133	26.4	40.4
7	142+000 LHS slowlane	11/2/2018	2	0.1361	0.0984	0.0543	0.0337	0.0168	0.0084	0.0151	26.4	40.4
7	142+000 LHS slowlane	11/2/2018	3	0.1351	0.0981	0.0555	0.0338	0.0139	0.0069	0.0142	26.3	40.4
7	142+250 LHS slowlane	11/2/2018	1	0.1843	0.1238	0.0671	0.0416	0.0267	0.0286	0.0143	26.5	40.4
7	142+250 LHS slowlane	11/2/2018	2	0.1844	0.1226	0.0709	0.0425	0.0279	0.0171	0.0141	26.5	40.4
7	142+250 LHS slowlane	11/2/2018	3	0.1765	0.1160	0.0650	0.0406	0.0259	0.0170	0.0133	26.5	40.4
7	142+500 LHS slowlane	11/2/2018	1	0.1330	0.0929	0.0546	0.0365	0.0251	0.0169	0.0145	26.6	40.4
7	142+500 LHS slowlane	11/2/2018	2	0.1330	0.0940	0.0565	0.0381	0.0270	0.0176	0.0152	26.6	40.4
7	142+500 LHS slowlane	11/2/2018	3	0.1325	0.0926	0.0553	0.0386	0.0254	0.0184	0.0129	26.6	40.4
7	142+750 LHS slowlane	11/2/2018	1	0.1571	0.1198	0.0745	0.0531	0.0355	0.0245	0.0169	26.7	40.4
7	142+750 LHS slowlane	11/2/2018	2	0.1646	0.1230	0.0760	0.0520	0.0351	0.0318	0.0185	26.7	40.4
7	142+750 LHS slowlane	11/2/2018	3	0.1545	0.1169	0.0721	0.0504	0.0336	0.0269	0.0166	26.7	40.4
7	143+000 LHS slowlane	11/2/2018	1	0.1447	0.0995	0.0646	0.0362	0.0205	0.0148	0.0074	26.8	40.4
7	143+000 LHS slowlane	11/2/2018	2	0.1435	0.1023	0.0627	0.0380	0.0254	0.0169	0.0084	26.8	40.4
7	143+000 LHS slowlane	11/2/2018	3	0.1414	0.0984	0.0639	0.0349	0.0225	0.0164	0.0082	26.8	40.4
7	143+250 LHS slowlane	11/2/2018	1	0.1418	0.1015	0.0652	0.0448	0.0299	0.0225	0.0185	26.8	40.4
7	143+250 LHS slowlane	11/2/2018	2	0.1422	0.1042	0.0663	0.0465	0.0320	0.0231	0.0162	26.8	40.4
7	143+250 LHS slowlane	11/2/2018	3	0.1392	0.1041	0.0677	0.0465	0.0310	0.0251	0.0178	26.8	40.4
7	143+500 LHS slowlane	11/2/2018	1	0.1046	0.0717	0.0436	0.0314	0.0224	0.0136	0.0068	26.8	40.4
7	143+500 LHS slowlane	11/2/2018	2	0.1049	0.0740	0.0443	0.0295	0.0203	0.0127	0.0063	26.8	40.4
7	143+500 LHS slowlane	11/2/2018	3	0.1049	0.0747	0.0437	0.0316	0.0237	0.0136	0.0121	26.8	40.4
7	143+750 LHS slowlane	11/2/2018	1	0.1307	0.0974	0.0538	0.0353	0.0264	0.0195	0.0154	26.9	40.4
7	143+750 LHS slowlane	11/2/2018	2	0.1331	0.0956	0.0570	0.0357	0.0265	0.0175	0.0111	26.9	40.4
7	143+750 LHS slowlane	11/2/2018	3	0.1281	0.0982	0.0584	0.0316	0.0290	0.0217	0.0138	26.9	40.4
7	144+000 LHS slowlane	11/2/2018	1	0.1473	0.0961	0.0534	0.0304	0.0216	0.0108	0.0054	27.0	40.4
7	144+000 LHS slowlane	11/2/2018	2	0.1442	0.0950	0.0549	0.0278	0.0209	0.0104	0.0052	26.9	40.4
7	144+000 LHS slowlane	11/2/2018	3	0.1457	0.0979	0.0542	0.0311	0.0217	0.0108	0.0054	26.9	40.4
7	144+250 LHS slowlane	11/2/2018	1	0.1163	0.0913	0.0613	0.0433	0.0278	0.0170	0.0030	27.0	40.4
7	144+250 LHS slowlane	11/2/2018	2	0.1135	0.0876	0.0597	0.0453	0.0285	0.0165	0.0138	27.0	40.4
7	144+250 LHS slowlane	11/2/2018	3	0.1137	0.0879	0.0594	0.0436	0.0291	0.0183	0.0144	27.0	40.4
7	144+500 LHS slowlane	11/2/2018	1	0.1267	0.1057	0.0565	0.0352	0.0302	0.0151	0.0132	26.8	40.4
7	144+500 LHS slowlane	11/2/2018	2	0.1253	0.1007	0.0587	0.0389	0.0320	0.0160	0.0139	26.8	40.4
7	144+500 LHS slowlane	11/2/2018	3	0.1292	0.1011	0.0639	0.0433	0.0311	0.0155	0.0134	26.8	40.4
7	144+750 LHS slowlane	11/2/2018	1	0.1511	0.1173	0.0795	0.0305	0.0381	0.0289	0.0238	26.6	40.4
7	144+750 LHS slowlane	11/2/2018	2	0.1525	0.1230	0.0820	0.0580	0.0374	0.0266	0.0212	26.6	40.4
7	144+750 LHS slowlane	11/2/2018	3	0.1533	0.1218	0.0840	0.0593	0.0394	0.0263	0.0191	26.6	40.4
7	145+000 LHS slowlane	11/2/2018	1	0.1304	0.0958	0.0625	0.0397	0.0280	0.0196	0.0173	26.6	40.4
7	145+000 LHS slowlane	11/2/2018	2	0.1343	0.1004	0.0655	0.0437	0.0296	0.0204	0.0161	26.6	40.4
7	145+000 LHS slowlane	11/2/2018	3	0.1260	0.0940	0.0595	0.0395	0.0276	0.0169	0.0148	26.6	40.4
7	145+250 LHS slowlane	11/2/2018	1	0.1174	0.0883	0.0541	0.0385	0.0285	0.0197	0.0185	26.7	40.4
7	145+250 LHS slowlane	11/2/2018	2	0.1186	0.0891	0.0573	0.0388	0.0291	0.0203	0.0161	26.7	40.4
7	145+250 LHS slowlane	11/2/2018	3	0.1154	0.0877	0.0550	0.0386	0.0293	0.0205	0.0156	26.8	40.4
7	145+500 LHS slowlane	11/2/2018	1	0.1680	0.1202	0.0747	0.0473	0.0301	0.0214	0.0159	26.9	40.4
7	145+500 LHS slowlane	11/2/2018	2	0.1664	0.1221	0.0743	0.0503	0.0293	0.0219	0.0156	26.9	40.4
7	145+500 LHS slowlane	11/2/2018	3	0.1659	0.1232	0.0743	0.0500	0.0301	0.0151	0.0075	26.9	40.4
7	145+750 LHS slowlane	11/2/2018	1	0.1248	0.0960	0.0570	0.0392	0.0280	0.0192	0.0205	26.8	40.4
7	145+750 LHS slowlane	11/2/2018	2	0.1258	0.0953	0.0579	0.0399	0.0285	0.0197	0.0179	26.8	40.4
7	145+750 LHS slowlane	11/2/2018	3	0.1215	0.0913	0.0596	0.0394	0.0283	0.0202	0.0167	26.8	40.4
7	146+000 LHS slowlane	11/2/2018	1	0.1010	0.0742	0.0506	0.0363	0.0249	0.0184	0.0157	26.8	42.6
7	146+000 LHS slowlane	11/2/2018	2	0.1021	0.0752	0.0485	0.0372	0.0277	0.0173	0.0154	26.8	42.6
7	146+000 LHS slowlane	11/2/2018	3	0.0977	0.0743	0.0498	0.0355	0.0285	0.0194	0.0135	26.7	42.6
7	146+250 LHS slowlane	11/2/2018	1	0.1449	0.1016	0.0561	0.0317	0.0304	0.0152	0.0170	26.4	42.6
7	146+250 LHS slowlane	11/2/2018	2	0.1487	0.0996	0.0585	0.0371	0.0226	0.0123	0.0014	26.4	42.6
7	146+250 LHS slowlane	11/2/2018	3	0.1457	0.0972	0.0569	0.0341	0.0244	0.0122	0.0061	26.4	42.6
7	146+750 LHS slowlane	11/2/2018	1	0.1381	0.0955	0.0599	0.0424	0.0283	0.0209	0.0127	26.6	42.6
7	146+750 LHS slowlane	11/2/2018	2	0.1365	0.0934	0.0588	0.0428	0.0287	0.0200	0.0129	26.5	42.6
7	146+750 LHS slowlane	11/2/2018	3	0.1333	0.0923	0.0593	0.0418	0.0285	0.0223	0.0155	26.5	42.6
7	147+000 LHS slowlane	11/2/2018	1	0.1091	0.0814	0.0497	0.0333	0.0221	0.0154	0.0077	26.8	42.6
7	147+000 LHS slowlane	11/2/2018	2	0.1044	0.0761	0.0471	0.0297	0.0192	0.0144	0.0148	26.8	42.6
7	147+000 LHS slowlane	11/2/2018	3	0.1058	0.0802	0.0499	0.0325	0.0200	0.0149	0.0133	26.8	42.6
7	147+250 LHS slowlane	11/2/2018	1	0.1402	0.1101	0.0682	0.0453	0.0338	0.0225	0.0184	26.9	42.6
7	147+250 LHS slowlane	11/2/2018	2	0.1458	0.1066	0.0714	0.0452	0.0358	0.0238	0.0189	26.9	42.6
7	147+250 LHS slowlane	11/2/2018	3	0.1397	0.1034	0.0691	0.0440	0.0346	0.0243	0.0182	26.9	42.6
7	147+500 LHS slowlane	11/2/2018	1	0.1788	0.1262	0.0718	0.0443	0.0286	0.0173	0.0158	26.9	42.6
7	147+500 LHS slowlane	11/2/2018	2	0.1770	0.1237	0.0693	0.0461	0.0300	0.0199	0.0183	26.9	42.6
7	147+500 LHS slowlane	11/2/2018	3	0.1747	0.1247	0.0692	0.0467	0.0297	0.0244	0.0155	26.8	42.6
7	147+750 LHS slowlane	11/2/2018	1	0.1338	0.0878	0.0539	0.0354	0.0262	0.0172	0.0143	26.7	42.6
7	147+750 LHS slowlane	11/2/2018	2	0.1307	0.0874	0.0533	0.0364	0.0248	0.0161	0.0158	26.7	42.6
7	147+750 LHS slowlane	11/2/2018	3	0.1296	0.0914	0.0538	0.0356	0.0243	0.0172	0.0137	26.7	42.6
7	148+000 LHS slowlane	11/2/2018	1	0.1886	0.1330	0.0751	0.0468	0.0326	0.0209	0.0168	26.8	42.6
7	148+000 LHS slowlane	11/2/2018	2	0.1922	0.1357	0.0787	0.0475	0.0363	0.0268	0.0201	26.8	42.6
7	148+000 LHS slowlane	11/2/2018	3	0.1848	0.1311	0.0758	0.0475	0.0338	0.0220	0.0189	26.8	42.6
7	148+250 LHS slowlane	11/2/2018	1	0.1539	0.1091	0.0668	0.0445	0.0286	0.0225	0.0160	26.7	42.6

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	148+250 LHS slowlane	11/2/2018	2	0.1455	0.1031	0.0636	0.0440	0.0295	0.0221	0.0127	26.8	42.6
7	148+250 LHS slowlane	11/2/2018	3	0.1504	0.1076	0.0656	0.0469	0.0293	0.0222	0.0160	26.7	42.6
7	148+500 LHS slowlane	11/2/2018	1	0.1742	0.1225	0.0738	0.0503	0.0336	0.0373	0.0182	26.8	42.6
7	148+500 LHS slowlane	11/2/2018	2	0.1769	0.1309	0.0782	0.0540	0.0378	0.0257	0.0199	26.7	42.6
7	148+500 LHS slowlane	11/2/2018	3	0.1748	0.1299	0.0780	0.0533	0.0361	0.0257	0.0204	26.7	42.6
7	148+750 LHS slowlane	11/2/2018	1	0.1127	0.0768	0.0507	0.0324	0.0257	0.0128	0.0064	26.7	42.6
7	148+750 LHS slowlane	11/2/2018	2	0.1123	0.0760	0.0472	0.0326	0.0230	0.0157	0.0123	26.7	42.6
7	148+750 LHS slowlane	11/2/2018	3	0.1107	0.0748	0.0479	0.0326	0.0243	0.0158	0.0129	26.7	42.6
7	149+000 LHS slowlane	11/2/2018	1	0.1453	0.0999	0.0579	0.0385	0.0252	0.0184	0.0092	27.0	42.6
7	149+000 LHS slowlane	11/2/2018	2	0.1409	0.0976	0.0588	0.0385	0.0255	0.0183	0.0127	27.0	42.6
7	149+000 LHS slowlane	11/2/2018	3	0.1416	0.0988	0.0591	0.0379	0.0259	0.0194	0.0134	27.0	42.6
7	149+250 LHS slowlane	11/2/2018	1	0.1621	0.1197	0.0714	0.0471	0.0301	0.0204	0.0162	27.0	42.6
7	149+250 LHS slowlane	11/2/2018	2	0.1625	0.1191	0.0730	0.0466	0.0298	0.0202	0.0149	27.0	42.6
7	149+250 LHS slowlane	11/2/2018	3	0.1635	0.1191	0.0708	0.0476	0.0290	0.0208	0.0153	27.1	42.6
7	149+500 LHS slowlane	11/2/2018	1	0.1439	0.0998	0.0630	0.0412	0.0291	0.0186	0.0172	27.0	42.6
7	149+500 LHS slowlane	11/2/2018	2	0.1413	0.1025	0.0638	0.0435	0.0300	0.0206	0.0129	27.1	42.6
7	149+500 LHS slowlane	11/2/2018	3	0.1442	0.0997	0.0624	0.0429	0.0291	0.0200	0.0156	27.1	42.6
7	149+750 LHS slowlane	11/2/2018	1	0.1351	0.0954	0.0590	0.0401	0.0297	0.0185	0.0283	27.2	42.6
7	149+750 LHS slowlane	11/2/2018	2	0.1341	0.0957	0.0594	0.0415	0.0300	0.0199	0.0036	27.2	42.6
7	149+750 LHS slowlane	11/2/2018	3	0.1339	0.0946	0.0577	0.0402	0.0300	0.0227	0.0113	27.2	42.6
7	150+000 LHS slowlane	11/2/2018	1	0.1273	0.0924	0.0587	0.0405	0.0285	0.0195	0.0178	27.2	42.6
7	150+000 LHS slowlane	11/2/2018	2	0.1265	0.0908	0.0581	0.0410	0.0276	0.0233	0.0189	27.2	42.6
7	150+000 LHS slowlane	11/2/2018	3	0.1202	0.0863	0.0545	0.0388	0.0272	0.0198	0.0166	27.2	42.6
7	150+250 LHS slowlane	11/2/2018	1	0.1290	0.0930	0.0574	0.0409	0.0290	0.0232	0.0166	27.1	42.6
7	150+250 LHS slowlane	11/2/2018	2	0.1299	0.0910	0.0568	0.0394	0.0295	0.0210	0.0171	27.1	42.6
7	150+250 LHS slowlane	11/2/2018	3	0.1294	0.0929	0.0607	0.0412	0.0306	0.0217	0.0191	27.1	42.6
7	150+500 LHS slowlane	11/2/2018	1	0.1219	0.0866	0.0542	0.0419	0.0282	0.0214	0.0207	27.1	42.6
7	150+500 LHS slowlane	11/2/2018	2	0.1267	0.0903	0.0576	0.0406	0.0292	0.0219	0.0219	27.1	42.6
7	150+500 LHS slowlane	11/2/2018	3	0.1218	0.0871	0.0549	0.0409	0.0286	0.0210	0.0181	27.1	42.6
7	150+750 LHS slowlane	11/2/2018	1	0.0772	0.0526	0.0388	0.0284	0.0186	0.0141	0.0070	27.2	42.6
7	150+750 LHS slowlane	11/2/2018	2	0.0775	0.0563	0.0364	0.0274	0.0217	0.0159	0.0088	27.1	42.6
7	150+750 LHS slowlane	11/2/2018	3	0.0783	0.0550	0.0374	0.0260	0.0060	0.0146	0.0022	27.1	42.6
7	151+000 LHS slowlane	11/2/2018	1	0.1348	0.0911	0.0570	0.0398	0.0264	0.0183	0.0166	27.1	42.6
7	151+000 LHS slowlane	11/2/2018	2	0.1336	0.0936	0.0600	0.0412	0.0294	0.0188	0.0158	27.1	42.6
7	151+000 LHS slowlane	11/2/2018	3	0.1316	0.0965	0.0616	0.0418	0.0312	0.0206	0.0149	27.1	42.6
7	151+250 LHS slowlane	11/2/2018	1	0.1173	0.0787	0.0442	0.0318	0.0223	0.0150	0.0064	27.2	42.6
7	151+250 LHS slowlane	11/2/2018	2	0.1178	0.0790	0.0471	0.0323	0.0220	0.0154	0.0077	27.2	42.6
7	151+250 LHS slowlane	11/2/2018	3	0.1154	0.0773	0.0464	0.0312	0.0231	0.0150	0.0075	27.2	42.6
7	151+500 LHS slowlane	11/2/2018	1	0.1313	0.0968	0.0620	0.0412	0.0280	0.0210	0.0159	27.2	42.6
7	151+500 LHS slowlane	11/2/2018	2	0.1317	0.0969	0.0620	0.0402	0.0299	0.0202	0.0153	27.3	42.6
7	151+500 LHS slowlane	11/2/2018	3	0.1317	0.0988	0.0620	0.0434	0.0293	0.0206	0.0163	27.2	42.6
7	151+750 LHS slowlane	11/2/2018	1	0.1292	0.0959	0.0597	0.0391	0.0254	0.0174	0.0165	27.3	42.6
7	151+750 LHS slowlane	11/2/2018	2	0.1306	0.0965	0.0592	0.0402	0.0274	0.0185	0.0153	27.2	42.6
7	151+750 LHS slowlane	11/2/2018	3	0.1273	0.0933	0.0571	0.0396	0.0249	0.0177	0.0159	27.2	42.6
7	152+000 LHS slowlane	11/2/2018	1	0.1408	0.1021	0.0618	0.0356	0.0256	0.0176	0.0137	27.2	42.6
7	152+000 LHS slowlane	11/2/2018	2	0.1435	0.1034	0.0632	0.0406	0.0280	0.0194	0.0128	27.2	42.6
7	152+000 LHS slowlane	11/2/2018	3	0.1399	0.1023	0.0615	0.0416	0.0260	0.0189	0.0125	27.2	42.6
7	152+250 LHS slowlane	11/2/2018	1	0.1428	0.0954	0.0528	0.0340	0.0212	0.0181	0.0090	27.2	42.6
7	152+250 LHS slowlane	11/2/2018	2	0.1425	0.0939	0.0523	0.0352	0.0224	0.0179	0.0160	27.2	42.6
7	152+250 LHS slowlane	11/2/2018	3	0.1449	0.0910	0.0516	0.0339	0.0225	0.0179	0.0089	27.2	42.6
7	152+500 LHS slowlane	11/2/2018	1	0.1581	0.1065	0.0619	0.0317	0.0245	0.0190	0.0095	27.2	42.6
7	152+500 LHS slowlane	11/2/2018	2	0.1606	0.1058	0.0616	0.0386	0.0258	0.0183	0.0158	27.2	42.6
7	152+500 LHS slowlane	11/2/2018	3	0.1593	0.1082	0.0628	0.0408	0.0257	0.0185	0.0138	27.2	42.6
7	152+750 LHS slowlane	11/2/2018	1	0.1347	0.0932	0.0552	0.0425	0.0309	0.0228	0.0114	27.2	42.6
7	152+750 LHS slowlane	11/2/2018	2	0.1332	0.0916	0.0581	0.0417	0.0310	0.0221	0.0184	27.2	42.6
7	152+750 LHS slowlane	11/2/2018	3	0.1327	0.0898	0.0590	0.0422	0.0325	0.0226	0.0175	27.2	42.6
7	153+000 LHS slowlane	11/2/2018	1	0.1347	0.0929	0.0595	0.0412	0.0277	0.0182	0.0149	27.2	43.6
7	153+000 LHS slowlane	11/2/2018	2	0.1342	0.0926	0.0581	0.0426	0.0277	0.0186	0.0093	27.3	43.6
7	153+000 LHS slowlane	11/2/2018	3	0.1314	0.0928	0.0577	0.0412	0.0272	0.0195	0.0168	27.3	43.6
7	153+250 LHS slowlane	11/2/2018	1	0.1299	0.0881	0.0521	0.0365	0.0269	0.0165	0.0155	27.4	43.6
7	153+250 LHS slowlane	11/2/2018	2	0.1305	0.0898	0.0542	0.0393	0.0288	0.0168	0.0162	27.3	43.6
7	153+250 LHS slowlane	11/2/2018	3	0.1290	0.0870	0.0552	0.0389	0.0272	0.0173	0.0149	27.4	43.6
7	153+500 LHS slowlane	11/2/2018	1	0.1223	0.0911	0.0565	0.0415	0.0265	0.0168	0.0131	27.3	43.6
7	153+500 LHS slowlane	11/2/2018	2	0.1181	0.0893	0.0573	0.0405	0.0261	0.0172	0.0134	27.3	43.6
7	153+500 LHS slowlane	11/2/2018	3	0.1186	0.0899	0.0581	0.0413	0.0278	0.0189	0.0094	27.3	43.6
7	153+750 LHS slowlane	11/2/2018	1	0.1669	0.1166	0.0688	0.0373	0.0253	0.0188	0.0132	27.2	44.4
7	153+750 LHS slowlane	11/2/2018	2	0.1648	0.1147	0.0672	0.0417	0.0274	0.0192	0.0145	27.2	44.4
7	153+750 LHS slowlane	11/2/2018	3	0.1589	0.1067	0.0620	0.0389	0.0269	0.0176	0.0126	27.2	44.4
7	154+000 LHS slowlane	11/2/2018	1	0.1631	0.1083	0.0655	0.0369	0.0239	0.0135	0.0067	27.0	44.4
7	154+000 LHS slowlane	11/2/2018	2	0.1603	0.1068	0.0642	0.0378	0.0239	0.0184	0.0130	27.0	44.4
7	154+000 LHS slowlane	11/2/2018	3	0.1590	0.1074	0.0643	0.0386	0.0234	0.0164	0.0082	27.0	44.4
7	154+250 LHS slowlane	11/2/2018	1	0.1499	0.1108	0.0687	0.0442	0.0299	0.0203	0.0152	26.8	44.4
7	154+250 LHS slowlane	11/2/2018	2	0.1523	0.1179	0.0743	0.0484	0.0314	0.0210	0.0105	26.7	44.4
7	154+250 LHS slowlane	11/2/2018	3	0.1539	0.1186	0.0733	0.0485	0.0321	0.0212	0.0124	26.8	44.4
7	154+500 LHS slowlane	11/2/2018	1	0.1827	0.1300	0.0774	0.0543	0.0344	0.0247	0.0193	26.8	44.4
7	154+500 LHS slowlane	11/2/2018	2	0.1829	0.1282	0.0751	0.0563	0.0351	0.0245	0.0188	26.8	44.4

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	154+500 LHS slowlane	11/2/2018	3	0.1784	0.1292	0.0762	0.0534	0.0339	0.0239	0.0166	26.8	44.4
7	154+750 LHS slowlane	11/2/2018	1	0.1427	0.1090	0.0693	0.0430	0.0326	0.0294	0.0170	26.9	44.4
7	154+750 LHS slowlane	11/2/2018	2	0.1433	0.1097	0.0710	0.0432	0.0320	0.0389	0.0176	26.9	44.4
7	154+750 LHS slowlane	11/2/2018	3	0.1412	0.1095	0.0689	0.0445	0.0338	0.0277	0.0188	26.9	44.4
7	155+000 LHS slowlane	11/2/2018	1	0.1632	0.1154	0.0707	0.0492	0.0279	0.0233	0.0136	26.9	44.4
7	155+000 LHS slowlane	11/2/2018	2	0.1638	0.1128	0.0722	0.0429	0.0319	0.0198	0.0200	26.9	44.4
7	155+000 LHS slowlane	11/2/2018	3	0.1588	0.1118	0.0721	0.0466	0.0309	0.0226	0.0119	26.9	44.4
7	155+250 LHS slowlane	11/2/2018	1	0.1642	0.1169	0.0673	0.0432	0.0274	0.0167	0.0179	26.9	44.4
7	155+250 LHS slowlane	11/2/2018	2	0.1648	0.1235	0.0711	0.0493	0.0234	0.0171	0.0200	26.9	44.4
7	155+250 LHS slowlane	11/2/2018	3	0.1666	0.1207	0.0697	0.0488	0.0265	0.0196	0.0181	26.9	44.4
7	155+500 LHS slowlane	11/2/2018	1	0.1621	0.1139	0.0712	0.0440	0.0342	0.0202	0.0111	26.8	44.4
7	155+500 LHS slowlane	11/2/2018	2	0.1604	0.1097	0.0682	0.0466	0.0295	0.0200	0.0160	26.9	44.4
7	155+500 LHS slowlane	11/2/2018	3	0.1570	0.1066	0.0670	0.0428	0.0306	0.0186	0.0093	26.9	44.4
7	155+750 LHS slowlane	11/2/2018	1	0.1513	0.1110	0.0688	0.0489	0.0333	0.0228	0.0183	26.9	44.4
7	155+750 LHS slowlane	11/2/2018	2	0.1490	0.1079	0.0670	0.0477	0.0318	0.0214	0.0177	26.9	44.4
7	155+750 LHS slowlane	11/2/2018	3	0.1503	0.1100	0.0686	0.0466	0.0319	0.0218	0.0183	26.9	44.4
7	156+000 LHS slowlane	11/2/2018	1	0.1402	0.0960	0.0520	0.0396	0.0246	0.0175	0.0192	26.9	44.4
7	156+000 LHS slowlane	11/2/2018	2	0.1400	0.0951	0.0546	0.0391	0.0238	0.0177	0.0088	26.9	44.4
7	156+000 LHS slowlane	11/2/2018	3	0.1378	0.0940	0.0535	0.0360	0.0251	0.0196	0.0138	26.9	44.4
7	156+250 LHS slowlane	11/2/2018	1	0.1399	0.1026	0.0659	0.0430	0.0288	0.0186	0.0140	26.8	44.4
7	156+250 LHS slowlane	11/2/2018	2	0.1424	0.1044	0.0665	0.0471	0.0294	0.0205	0.0136	26.8	44.4
7	156+250 LHS slowlane	11/2/2018	3	0.1407	0.1050	0.0667	0.0459	0.0296	0.0205	0.0146	26.8	44.4
7	156+500 LHS slowlane	11/2/2018	1	0.1902	0.1432	0.0775	0.0503	0.0320	0.0185	0.0144	26.9	44.4
7	156+500 LHS slowlane	11/2/2018	2	0.1897	0.1427	0.0792	0.0502	0.0317	0.0218	0.0142	26.9	44.4
7	156+500 LHS slowlane	11/2/2018	3	0.1881	0.1404	0.0825	0.0540	0.0325	0.0239	0.0161	26.9	44.4
7	156+750 LHS slowlane	11/2/2018	1	0.1495	0.1048	0.0626	0.0432	0.0294	0.0222	0.0056	26.8	44.4
7	156+750 LHS slowlane	11/2/2018	2	0.1498	0.1055	0.0615	0.0416	0.0256	0.0187	0.0151	26.8	44.4
7	156+750 LHS slowlane	11/2/2018	3	0.1530	0.1049	0.0643	0.0432	0.0288	0.0186	0.0123	26.8	44.4
7	157+000 LHS slowlane	11/2/2018	1	0.1750	0.1204	0.0702	0.0468	0.0333	0.0258	0.0192	26.7	44.4
7	157+000 LHS slowlane	11/2/2018	2	0.1706	0.1179	0.0701	0.0472	0.0338	0.0251	0.0209	26.6	44.4
7	157+000 LHS slowlane	11/2/2018	3	0.1694	0.1177	0.0732	0.0486	0.0335	0.0276	0.0203	26.6	44.4
7	157+250 LHS slowlane	11/2/2018	1	0.2020	0.1427	0.0781	0.0483	0.0350	0.0235	0.0208	26.7	44.4
7	157+250 LHS slowlane	11/2/2018	2	0.1964	0.1386	0.0747	0.0497	0.0355	0.0263	0.0193	26.6	44.4
7	157+250 LHS slowlane	11/2/2018	3	0.1929	0.1330	0.0735	0.0473	0.0325	0.0236	0.0174	26.7	44.4
7	157+500 LHS slowlane	11/2/2018	1	0.1941	0.1382	0.0742	0.0475	0.0298	0.0209	0.0136	26.7	44.4
7	157+500 LHS slowlane	11/2/2018	2	0.1974	0.1374	0.0761	0.0487	0.0318	0.0193	0.0139	26.7	44.4
7	157+500 LHS slowlane	11/2/2018	3	0.1943	0.1313	0.0775	0.0497	0.0293	0.0237	0.0144	26.7	44.4
7	157+750 LHS slowlane	11/2/2018	1	0.1684	0.1143	0.0620	0.0386	0.0272	0.0191	0.0095	26.6	44.4
7	157+750 LHS slowlane	11/2/2018	2	0.1712	0.1116	0.0620	0.0412	0.0283	0.0209	0.0122	26.6	44.4
7	157+750 LHS slowlane	11/2/2018	3	0.1728	0.1179	0.0661	0.0424	0.0305	0.0197	0.0142	26.5	44.4
7	158+000 LHS slowlane	11/2/2018	1	0.1509	0.1028	0.0623	0.0433	0.0289	0.0214	0.0214	26.5	44.4
7	158+000 LHS slowlane	11/2/2018	2	0.1524	0.1055	0.0628	0.0425	0.0285	0.0226	0.0208	26.5	44.4
7	158+000 LHS slowlane	11/2/2018	3	0.1491	0.1024	0.0589	0.0421	0.0247	0.0221	0.0198	26.5	44.4
7	158+250 LHS slowlane	11/2/2018	1	0.1407	0.0925	0.0556	0.0366	0.0266	0.0186	0.0147	26.6	44.4
7	158+250 LHS slowlane	11/2/2018	2	0.1440	0.0949	0.0580	0.0398	0.0280	0.0185	0.0146	26.6	44.4
7	158+250 LHS slowlane	11/2/2018	3	0.1410	0.0942	0.0566	0.0379	0.0266	0.0191	0.0140	26.6	44.4
7	158+500 LHS slowlane	11/2/2018	1	0.1473	0.0912	0.0530	0.0324	0.0219	0.0179	0.0089	26.6	44.4
7	158+500 LHS slowlane	11/2/2018	2	0.1433	0.0884	0.0525	0.0322	0.0220	0.0167	0.0083	26.6	44.4
7	158+500 LHS slowlane	11/2/2018	3	0.1459	0.0938	0.0526	0.0336	0.0234	0.0193	0.0125	26.6	44.4
7	158+750 LHS slowlane	11/2/2018	1	0.1309	0.0942	0.0576	0.0426	0.0313	0.0191	0.0153	26.6	44.4
7	158+750 LHS slowlane	11/2/2018	2	0.1305	0.0968	0.0587	0.0430	0.0335	0.0143	0.0092	26.6	44.4
7	158+750 LHS slowlane	11/2/2018	3	0.1294	0.0938	0.0552	0.0431	0.0318	0.0177	0.0146	26.6	44.4
7	159+000 LHS slowlane	11/2/2018	1	0.1290	0.0872	0.0478	0.0320	0.0211	0.0129	0.0007	26.8	44.4
7	159+000 LHS slowlane	11/2/2018	2	0.1304	0.0846	0.0510	0.0331	0.0225	0.0112	0.0056	26.8	44.4
7	159+000 LHS slowlane	11/2/2018	3	0.1354	0.0888	0.0529	0.0334	0.0237	0.0114	0.0057	26.8	44.4
7	159+250 LHS slowlane	11/2/2018	1	0.1478	0.1043	0.0654	0.0461	0.0309	0.0169	0.0137	27.2	44.4
7	159+250 LHS slowlane	11/2/2018	2	0.1457	0.1048	0.0675	0.0456	0.0308	0.0200	0.0139	27.2	44.4
7	159+250 LHS slowlane	11/2/2018	3	0.1487	0.1079	0.0701	0.0470	0.0300	0.0243	0.0138	27.2	44.4
7	159+500 LHS slowlane	11/2/2018	1	0.1513	0.1035	0.0614	0.0371	0.0241	0.0195	0.0164	27.2	44.4
7	159+500 LHS slowlane	11/2/2018	2	0.1469	0.0980	0.0599	0.0358	0.0239	0.0190	0.0101	27.2	44.4
7	159+500 LHS slowlane	11/2/2018	3	0.1490	0.1037	0.0605	0.0385	0.0249	0.0181	0.0141	27.2	44.4
7	159+750 LHS slowlane	11/2/2018	1	0.1180	0.0737	0.0429	0.0248	0.0153	0.0076	0.0038	27.2	44.4
7	159+750 LHS slowlane	11/2/2018	2	0.1168	0.0682	0.0410	0.0237	0.0191	0.0120	0.0136	27.2	44.4
7	159+750 LHS slowlane	11/2/2018	3	0.1149	0.0709	0.0416	0.0221	0.0181	0.0151	0.0047	27.2	44.4
7	160+000 LHS slowlane	11/2/2018	1	0.1192	0.0786	0.0517	0.0334	0.0327	0.0163	0.0007	27.2	44.4
7	160+000 LHS slowlane	11/2/2018	2	0.1039	0.0741	0.0496	0.0358	0.0264	0.0202	0.0157	27.2	44.4
7	160+000 LHS slowlane	11/2/2018	3	0.1039	0.0714	0.0504	0.0324	0.0247	0.0189	0.0142	27.2	44.4
7	160+250 LHS slowlane	11/2/2018	1	0.1830	0.1150	0.0572	0.0398	0.0328	0.0187	0.0204	27.2	44.4
7	160+250 LHS slowlane	11/2/2018	2	0.1816	0.1140	0.0640	0.0388	0.0245	0.0177	0.0151	27.2	44.4
7	160+250 LHS slowlane	11/2/2018	3	0.1790	0.1151	0.0637	0.0404	0.0265	0.0189	0.0188	27.2	44.4
7	160+500 LHS slowlane	11/2/2018	1	0.1530	0.0985	0.0590	0.0412	0.0292	0.0173	0.0148	27.2	44.4
7	160+500 LHS slowlane	11/2/2018	2	0.1455	0.0924	0.0568	0.0379	0.0272	0.0160	0.0155	27.2	44.4
7	160+500 LHS slowlane	11/2/2018	3	0.1461	0.0973	0.0592	0.0403	0.0301	0.0131	0.0139	27.2	44.4
7	160+750 LHS slowlane	11/2/2018	1	0.1671	0.1184	0.0637	0.0399	0.0253	0.0199	0.0099	27.2	44.4
7	160+750 LHS slowlane	11/2/2018	2	0.1592	0.1148	0.0571	0.0392	0.0259	0.0179	0.0017	27.2	44.4
7	160+750 LHS slowlane	11/2/2018	3	0.1632	0.1203	0.0602	0.0413	0.0297	0.0148	0.0074	27.2	44.4



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	161+000 LHS slowlane	11/2/2018	1	0.1616	0.1108	0.0582	0.0362	0.0259	0.1390	0.0147	27.2	44.4
7	161+000 LHS slowlane	11/2/2018	2	0.1619	0.1153	0.0636	0.0368	0.0259	0.0197	0.0147	27.2	44.4
7	161+000 LHS slowlane	11/2/2018	3	0.1625	0.1169	0.0621	0.0397	0.0234	0.0137	0.0126	27.2	44.4
7	161+250 LHS slowlane	11/2/2018	1	0.1960	0.1450	0.0729	0.0406	0.0331	0.0559	0.0357	27.3	44.4
7	161+250 LHS slowlane	11/2/2018	2	0.1813	0.1364	0.0607	0.0443	0.0978	0.0157	0.0078	27.4	44.4
7	161+250 LHS slowlane	11/2/2018	3	0.1997	0.1510	0.0670	0.0443	0.0232	0.0210	0.0297	27.4	44.4
7	161+500 LHS slowlane	11/2/2018	1	0.1810	0.1323	0.0796	0.0426	0.0254	0.0256	0.0128	27.4	44.4
7	161+500 LHS slowlane	11/2/2018	2	0.1840	0.1338	0.0782	0.0409	0.0146	0.0244	0.0210	27.4	44.4
7	161+500 LHS slowlane	11/2/2018	3	0.1790	0.1321	0.0759	0.0389	0.0142	0.0221	0.0210	27.4	44.4
7	161+750 LHS slowlane	11/2/2018	1	0.1781	0.1170	0.0711	0.0411	0.0217	0.0108	0.0148	27.3	44.1
7	161+750 LHS slowlane	11/2/2018	2	0.1622	0.1206	0.0746	0.0502	0.0324	0.0202	0.0176	27.3	44.1
7	161+750 LHS slowlane	11/2/2018	3	0.1716	0.1221	0.0749	0.0439	0.0238	0.0166	0.0178	27.3	44.1
7	163+000 LHS slowlane	11/2/2018	1	0.1978	0.1435	0.0788	0.0516	0.0343	0.0172	0.0175	27.2	44.1
7	163+000 LHS slowlane	11/2/2018	2	0.1946	0.1425	0.0794	0.0512	0.0295	0.0238	0.0119	27.2	44.1
7	163+000 LHS slowlane	11/2/2018	3	0.1917	0.1405	0.0781	0.0484	0.0308	0.0190	0.0154	27.1	44.1
7	163+250 LHS slowlane	11/2/2018	1	0.1198	0.0751	0.0422	0.0277	0.0177	0.0127	0.0147	27.0	44.1
7	163+250 LHS slowlane	11/2/2018	2	0.1176	0.0747	0.0439	0.0288	0.0185	0.0140	0.0106	27.0	44.1
7	163+250 LHS slowlane	11/2/2018	3	0.1156	0.0744	0.0430	0.0317	0.0187	0.0071	0.0116	27.0	44.1
7	163+500 LHS slowlane	11/2/2018	1	0.1437	0.0984	0.0601	0.0353	0.0251	0.0186	0.0177	27.0	44.1
7	163+500 LHS slowlane	11/2/2018	2	0.1393	0.0981	0.0586	0.0343	0.0247	0.0184	0.0204	27.0	44.1
7	163+500 LHS slowlane	11/2/2018	3	0.1418	0.0962	0.0585	0.0356	0.0290	0.0222	0.0191	26.9	44.1
7	163+750 LHS slowlane	11/2/2018	1	0.1326	0.0883	0.0517	0.0297	0.0210	0.0156	0.0054	26.7	44.1
7	163+750 LHS slowlane	11/2/2018	2	0.1320	0.0852	0.0547	0.0331	0.0224	0.0180	0.0141	26.7	44.1
7	163+750 LHS slowlane	11/2/2018	3	0.1328	0.0862	0.0533	0.0346	0.0216	0.0181	0.0061	26.7	44.1
7	164+000 LHS slowlane	11/2/2018	1	0.1704	0.1205	0.0638	0.0484	0.0292	0.0207	0.0103	26.7	44.1
7	164+000 LHS slowlane	11/2/2018	2	0.1650	0.1187	0.0670	0.0437	0.0299	0.0263	0.0131	26.7	44.1
7	164+000 LHS slowlane	11/2/2018	3	0.1641	0.1176	0.0671	0.0435	0.0269	0.0229	0.0114	26.7	44.1
7	164+250 LHS slowlane	11/2/2018	1	0.1516	0.1089	0.0638	0.0416	0.0240	0.0055	0.0065	26.7	44.1
7	164+250 LHS slowlane	11/2/2018	2	0.1486	0.1069	0.0635	0.0398	0.0217	0.0108	0.0054	26.7	44.1
7	164+250 LHS slowlane	11/2/2018	3	0.1495	0.1074	0.0641	0.0429	0.0248	0.0128	0.0064	26.7	44.1
7	164+500 LHS slowlane	11/2/2018	1	0.1624	0.1192	0.0637	0.0419	0.0327	0.0228	0.0202	26.7	44.1
7	164+500 LHS slowlane	11/2/2018	2	0.1616	0.1096	0.0685	0.0428	0.0304	0.0243	0.0227	26.7	44.1
7	164+500 LHS slowlane	11/2/2018	3	0.1592	0.1064	0.0664	0.0436	0.0307	0.0176	0.0232	26.7	44.1
7	164+750 LHS slowlane	11/2/2018	1	0.1288	0.0918	0.0516	0.0387	0.0234	0.0166	0.0143	26.7	44.1
7	164+750 LHS slowlane	11/2/2018	2	0.1282	0.0923	0.0551	0.0403	0.0248	0.0123	0.0151	26.7	44.1
7	164+750 LHS slowlane	11/2/2018	3	0.1267	0.0910	0.0563	0.0331	0.0179	0.0033	0.0112	26.7	44.1
7	165+000 LHS slowlane	11/2/2018	1	0.1585	0.1127	0.0692	0.0447	0.0360	0.0204	0.0140	26.6	44.1
7	165+000 LHS slowlane	11/2/2018	2	0.1546	0.1180	0.0730	0.0408	0.0394	0.0194	0.0033	26.6	44.1
7	165+000 LHS slowlane	11/2/2018	3	0.1602	0.1170	0.0704	0.0458	0.0367	0.0236	0.0161	26.6	44.1
7	165+250 LHS slowlane	11/2/2018	1	0.1348	0.0928	0.0569	0.0401	0.0261	0.0181	0.0154	26.7	44.1
7	165+250 LHS slowlane	11/2/2018	2	0.1325	0.0991	0.0563	0.0397	0.0290	0.0189	0.0144	26.7	44.1
7	165+250 LHS slowlane	11/2/2018	3	0.1292	0.0999	0.0580	0.0406	0.0275	0.0197	0.0157	26.7	44.1
7	165+500 LHS slowlane	11/2/2018	1	0.1266	0.0922	0.0651	0.0456	0.0364	0.0251	0.0125	26.7	44.1
7	165+500 LHS slowlane	11/2/2018	2	0.1210	0.0891	0.0602	0.0472	0.0315	0.0229	0.0114	26.7	44.1
7	165+500 LHS slowlane	11/2/2018	3	0.1212	0.0901	0.0626	0.0466	0.0331	0.0215	0.0130	26.7	44.1
7	165+750 LHS slowlane	11/2/2018	1	0.1466	0.0989	0.0626	0.0394	0.0415	0.0235	0.0174	26.7	44.1
7	165+750 LHS slowlane	11/2/2018	2	0.1471	0.0984	0.0632	0.0373	0.0383	0.0221	0.0179	26.7	44.1
7	165+750 LHS slowlane	11/2/2018	3	0.1455	0.0988	0.0626	0.0391	0.0270	0.0251	0.0176	26.7	44.1
7	166+000 LHS slowlane	11/2/2018	1	0.1381	0.0952	0.0610	0.0407	0.0275	0.0162	0.0157	26.8	44.1
7	166+000 LHS slowlane	11/2/2018	2	0.1379	0.0951	0.0598	0.0299	0.0161	0.0080	0.0040	26.8	44.1
7	166+000 LHS slowlane	11/2/2018	3	0.1375	0.0965	0.0610	0.0418	0.0274	0.0171	0.0085	26.8	44.1
7	166+250 LHS slowlane	11/2/2018	1	0.1476	0.1089	0.0672	0.0430	0.0328	0.0168	0.0132	26.7	44.1
7	166+250 LHS slowlane	11/2/2018	2	0.1445	0.1047	0.0667	0.0440	0.0303	0.0205	0.0138	26.7	44.1
7	166+250 LHS slowlane	11/2/2018	3	0.1445	0.1047	0.0667	0.0440	0.0303	0.0205	0.0138	26.7	44.1
7	166+500 LHS slowlane	11/2/2018	1	0.1452	0.0987	0.0593	0.0379	0.0242	0.0158	0.0158	26.7	44.1
7	166+500 LHS slowlane	11/2/2018	2	0.1425	0.0991	0.0605	0.0386	0.0259	0.0195	0.0157	26.7	44.1
7	166+500 LHS slowlane	11/2/2018	3	0.1413	0.0987	0.0573	0.0390	0.0252	0.0192	0.0143	26.7	44.1
7	166+750 LHS slowlane	11/2/2018	1	0.1346	0.0972	0.0633	0.0468	0.0329	0.0175	0.0170	26.7	44.1
7	166+750 LHS slowlane	11/2/2018	2	0.1331	0.0952	0.0629	0.0422	0.0295	0.0208	0.0180	26.6	44.1
7	166+750 LHS slowlane	11/2/2018	3	0.1324	0.0977	0.0641	0.0445	0.0322	0.0192	0.0179	26.6	44.1
7	167+000 LHS slowlane	11/2/2018	1	0.1552	0.1167	0.0723	0.0472	0.0308	0.0177	0.0088	26.6	44.1
7	167+000 LHS slowlane	11/2/2018	2	0.1566	0.1200	0.0746	0.0464	0.0324	0.0202	0.0178	26.5	44.1
7	167+000 LHS slowlane	11/2/2018	3	0.1535	0.1162	0.0732	0.0485	0.0314	0.0208	0.0179	26.6	44.1
7	167+250 LHS slowlane	11/2/2018	1	0.1890	0.1259	0.0693	0.0416	0.0263	0.0178	0.0176	26.6	44.1
7	167+250 LHS slowlane	11/2/2018	2	0.1849	0.1248	0.0689	0.0427	0.0299	0.0189	0.0178	26.6	44.1
7	167+250 LHS slowlane	11/2/2018	3	0.1823	0.1242	0.0696	0.0428	0.0309	0.0196	0.0180	26.6	44.1
7	167+500 LHS slowlane	11/2/2018	1	0.1850	0.1311	0.0741	0.0487	0.0407	0.0191	0.0179	26.6	44.1
7	167+500 LHS slowlane	11/2/2018	2	0.1874	0.1329	0.0777	0.0495	0.0412	0.0178	0.0174	26.6	44.1
7	167+500 LHS slowlane	11/2/2018	3	0.1899	0.1317	0.0776	0.0516	0.0380	0.0243	0.0205	26.6	44.1
7	167+750 LHS slowlane	11/2/2018	1	0.1924	0.1421	0.0843	0.0508	0.0305	0.0196	0.0177	26.6	44.1
7	167+750 LHS slowlane	11/2/2018	2	0.1943	0.1407	0.0845	0.0526	0.0365	0.0251	0.0201	26.6	44.1
7	167+750 LHS slowlane	11/2/2018	3	0.1913	0.1369	0.0843	0.0526	0.0358	0.0253	0.0196	26.6	44.1
7	168+000 LHS slowlane	11/2/2018	1	0.1150	0.0808	0.0391	0.0331	0.0190	0.0136	0.0151	26.6	44.1
7	168+000 LHS slowlane	11/2/2018	2	0.1140	0.0794	0.0491	0.0350	0.0186	0.0135	0.0226	26.6	44.1
7	168+000 LHS slowlane	11/2/2018	3	0.1142	0.0762	0.0413	0.0332	0.0224	0.0168	0.0135	26.6	44.1
7	168+250 LHS slowlane	11/2/2018	1	0.1415	0.0943	0.0626	0.0350	0.0267	0.0193	0.0096	26.6	44.1

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	168+250 LHS slowlane	11/2/2018	2	0.1398	0.0958	0.0589	0.0396	0.0267	0.0189	0.0156	26.6	44.1
7	168+250 LHS slowlane	11/2/2018	3	0.1343	0.0936	0.0587	0.0371	0.0253	0.0179	0.0154	26.6	44.1
7	168+500 LHS slowlane	11/2/2018	1	0.1383	0.0957	0.0554	0.0339	0.0260	0.0184	0.0141	26.5	44.1
7	168+500 LHS slowlane	11/2/2018	2	0.1363	0.0927	0.0540	0.0369	0.0271	0.0202	0.0158	26.5	44.1
7	168+500 LHS slowlane	11/2/2018	3	0.1382	0.0919	0.0557	0.0381	0.0275	0.0178	0.0070	26.5	44.1
7	168+750 LHS slowlane	11/2/2018	1	0.1500	0.1031	0.0635	0.0430	0.0248	0.0179	0.0168	26.6	43
7	168+750 LHS slowlane	11/2/2018	2	0.1483	0.1058	0.0647	0.0428	0.0300	0.0182	0.0144	26.6	43
7	168+750 LHS slowlane	11/2/2018	3	0.1447	0.1059	0.0640	0.0452	0.0261	0.0150	0.0169	26.6	43
7	169+000 LHS slowlane	11/2/2018	1	0.1595	0.1253	0.0759	0.0525	0.0345	0.0228	0.0132	26.5	43
7	169+000 LHS slowlane	11/2/2018	2	0.1618	0.1214	0.0762	0.0511	0.0365	0.0235	0.0179	26.5	43
7	169+000 LHS slowlane	11/2/2018	3	0.1602	0.1244	0.0792	0.0505	0.0377	0.0226	0.0185	26.5	43
7	169+250 LHS slowlane	11/2/2018	1	0.1599	0.1147	0.0692	0.0461	0.0353	0.0221	0.0166	26.5	43
7	169+250 LHS slowlane	11/2/2018	2	0.1583	0.1124	0.0731	0.0462	0.0372	0.0237	0.0182	26.5	43
7	169+250 LHS slowlane	11/2/2018	3	0.1583	0.1142	0.0696	0.0472	0.0397	0.0254	0.0157	26.5	43
7	169+500 LHS slowlane	11/2/2018	1	0.1737	0.1291	0.0760	0.0493	0.0349	0.0249	0.0147	26.5	43
7	169+500 LHS slowlane	11/2/2018	2	0.1743	0.1266	0.0756	0.0534	0.0347	0.0251	0.0189	26.5	43
7	169+500 LHS slowlane	11/2/2018	3	0.1742	0.1283	0.0786	0.0527	0.0357	0.0247	0.0200	26.5	43
7	169+750 LHS slowlane	11/2/2018	1	0.1751	0.1214	0.0681	0.0437	0.0314	0.0219	0.0157	26.5	43
7	169+750 LHS slowlane	11/2/2018	2	0.1732	0.1187	0.0682	0.0430	0.0293	0.0223	0.0178	26.5	43
7	169+750 LHS slowlane	11/2/2018	3	0.1702	0.1179	0.0680	0.0430	0.0295	0.0227	0.0167	26.4	43
7	170+000 LHS slowlane	11/2/2018	1	0.1493	0.1025	0.0568	0.0437	0.0247	0.0202	0.0169	26.4	43
7	170+000 LHS slowlane	11/2/2018	2	0.1429	0.1015	0.0598	0.0322	0.0278	0.0194	0.0136	26.4	43
7	170+000 LHS slowlane	11/2/2018	3	0.1479	0.1019	0.0604	0.0380	0.0271	0.0184	0.0144	26.4	43
7	170+250 LHS slowlane	11/2/2018	1	0.1456	0.0974	0.0558	0.0337	0.0216	0.0158	0.0038	26.3	43
7	170+250 LHS slowlane	11/2/2018	2	0.1444	0.0947	0.0557	0.0327	0.0205	0.0148	0.0020	26.3	43
7	170+250 LHS slowlane	11/2/2018	3	0.1483	0.1015	0.0566	0.0387	0.0218	0.0173	0.0086	26.3	43
7	170+500 LHS slowlane	11/2/2018	1	0.1537	0.1077	0.0652	0.0440	0.0281	0.0122	0.0180	26.3	43
7	170+500 LHS slowlane	11/2/2018	2	0.1453	0.1059	0.0650	0.0429	0.0293	0.0132	0.0208	26.3	43
7	170+500 LHS slowlane	11/2/2018	3	0.1458	0.1041	0.0638	0.0432	0.0295	0.0153	0.0183	26.3	43
7	170+750 LHS slowlane	11/2/2018	1	0.0995	0.0797	0.0525	0.0364	0.0253	0.0182	0.0091	26.4	43
7	170+750 LHS slowlane	11/2/2018	2	0.0998	0.0837	0.0549	0.0321	0.0277	0.0133	0.0095	26.4	43
7	170+750 LHS slowlane	11/2/2018	3	0.0993	0.0795	0.0546	0.0348	0.0270	0.0163	0.0141	26.4	43
7	171+000 LHS slowlane	11/2/2018	1	0.2302	0.1709	0.0977	0.0634	0.0573	0.0365	0.0293	26.4	43
7	171+000 LHS slowlane	11/2/2018	2	0.2273	0.1725	0.0946	0.0529	0.0622	0.0348	0.0291	26.4	43
7	171+000 LHS slowlane	11/2/2018	3	0.2251	0.1703	0.0973	0.0624	0.0602	0.0380	0.0303	26.4	43
7	171+250 LHS slowlane	11/2/2018	1	0.1550	0.1106	0.0637	0.0432	0.0345	0.0237	0.0184	26.4	43
7	171+250 LHS slowlane	11/2/2018	2	0.1557	0.1111	0.0653	0.0437	0.0363	0.0239	0.0198	26.4	43
7	171+250 LHS slowlane	11/2/2018	3	0.1544	0.1096	0.0631	0.0440	0.0359	0.0252	0.0172	26.4	43
7	171+500 LHS slowlane	11/2/2018	1	0.1444	0.1077	0.0752	0.0536	0.0401	0.0148	0.0238	26.4	43
7	171+500 LHS slowlane	11/2/2018	2	0.1446	0.1101	0.0759	0.0539	0.0367	0.0180	0.0236	26.4	43
7	171+500 LHS slowlane	11/2/2018	3	0.1445	0.1116	0.0761	0.0579	0.0351	0.0175	0.0236	26.4	43
7	171+750 LHS slowlane	11/2/2018	1	0.1626	0.1146	0.0650	0.0465	0.0367	0.0229	0.0165	26.4	43
7	171+750 LHS slowlane	11/2/2018	2	0.1581	0.1134	0.0669	0.0418	0.0334	0.0222	0.0187	26.4	43
7	171+750 LHS slowlane	11/2/2018	3	0.1607	0.1169	0.0654	0.0506	0.0321	0.0210	0.0178	26.4	43
7	172+000 LHS slowlane	11/2/2018	1	0.1000	0.0736	0.0465	0.0327	0.0280	0.0117	0.0181	26.3	43
7	172+000 LHS slowlane	11/2/2018	2	0.1003	0.0712	0.0452	0.0331	0.0229	0.0161	0.0177	26.3	43
7	172+000 LHS slowlane	11/2/2018	3	0.0977	0.0714	0.0463	0.0308	0.0223	0.0155	0.0145	26.3	43
7	172+250 LHS slowlane	11/2/2018	1	0.1732	0.1171	0.0721	0.0463	0.0306	0.0284	0.0286	26.3	43
7	172+250 LHS slowlane	11/2/2018	2	0.1710	0.1169	0.0713	0.0488	0.0352	0.0246	0.0196	26.4	43
7	172+250 LHS slowlane	11/2/2018	3	0.1699	0.1177	0.0732	0.0481	0.0347	0.0296	0.0271	26.4	43
7	172+500 LHS slowlane	11/2/2018	1	0.1204	0.0803	0.0492	0.0358	0.0258	0.0192	0.0175	26.5	43
7	172+500 LHS slowlane	11/2/2018	2	0.1170	0.0785	0.0481	0.0330	0.0274	0.0187	0.0184	26.5	43
7	172+500 LHS slowlane	11/2/2018	3	0.1196	0.0811	0.0503	0.0355	0.0261	0.0201	0.0176	26.5	43
7	172+750 LHS slowlane	11/2/2018	1	0.2430	0.1744	0.0937	0.0582	0.0359	0.0308	0.0222	26.5	43
7	172+750 LHS slowlane	11/2/2018	2	0.2440	0.1719	0.0965	0.0574	0.0367	0.0258	0.0243	26.5	43
7	172+750 LHS slowlane	11/2/2018	3	0.2422	0.1707	0.0948	0.0580	0.0378	0.0284	0.0231	26.5	43
7	173+000 LHS slowlane	11/2/2018	1	0.1566	0.1159	0.0779	0.0557	0.0384	0.0296	0.0199	26.4	43
7	173+000 LHS slowlane	11/2/2018	2	0.1573	0.1145	0.0782	0.0535	0.0373	0.0237	0.0192	26.4	43
7	173+000 LHS slowlane	11/2/2018	3	0.1547	0.1147	0.0678	0.0478	0.0347	0.0247	0.0189	26.4	43
7	173+250 LHS slowlane	11/2/2018	1	0.1428	0.1029	0.0636	0.0453	0.0354	0.0255	0.0208	26.4	43
7	173+250 LHS slowlane	11/2/2018	2	0.1426	0.1013	0.0633	0.0457	0.0348	0.0250	0.0205	26.4	43
7	173+250 LHS slowlane	11/2/2018	3	0.1368	0.0987	0.0631	0.0446	0.0352	0.0238	0.0219	26.4	43
7	173+500 LHS slowlane	11/2/2018	1	0.1875	0.1341	0.0772	0.0444	0.0216	0.0245	0.0122	26.4	43
7	173+500 LHS slowlane	11/2/2018	2	0.1850	0.1329	0.0743	0.0436	0.0272	0.0249	0.0124	26.4	43
7	173+500 LHS slowlane	11/2/2018	3	0.1855	0.1343	0.0761	0.0456	0.0290	0.0232	0.0153	26.4	43
7	173+750 LHS slowlane	11/2/2018	1	0.1378	0.1050	0.0734	0.0457	0.0313	0.0211	0.0105	26.5	43
7	173+750 LHS slowlane	11/2/2018	2	0.1331	0.1052	0.0812	0.0451	0.0317	0.0175	0.0030	26.5	43
7	173+750 LHS slowlane	11/2/2018	3	0.1316	0.1050	0.0723	0.0445	0.0311	0.0255	0.0127	26.4	43
7	174+000 LHS slowlane	11/2/2018	1	0.1831	0.1348	0.0813	0.0439	0.0313	0.0207	0.0171	26.5	43
7	174+000 LHS slowlane	11/2/2018	2	0.1809	0.1298	0.0813	0.0451	0.0338	0.0184	0.0200	26.5	43
7	174+000 LHS slowlane	11/2/2018	3	0.1752	0.1293	0.0814	0.0446	0.0324	0.0197	0.0204	26.5	43
7	174+250 LHS slowlane	11/2/2018	1	0.1385	0.1001	0.0671	0.0302	0.0151	0.0075	0.0166	26.6	43
7	174+250 LHS slowlane	11/2/2018	2	0.1372	0.0994	0.0644	0.0370	0.0359	0.0185	0.0174	26.6	43
7	174+250 LHS slowlane	11/2/2018	3	0.1347	0.0879	0.0617	0.0310	0.0278	0.0098	0.0146	26.6	43
7	174+500 LHS slowlane	11/2/2018	1	0.1662	0.1169	0.0559	0.0517	0.0311	0.0172	0.0154	26.3	43
7	174+500 LHS slowlane	11/2/2018	2	0.1611	0.1181	0.0537	0.0496	0.0339	0.0677	0.0314	26.3	43



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	174+500 LHS slowlane	11/2/2018	3	0.1635	0.1200	0.0548	0.0529	0.0341	0.0231	0.0180	26.3	43
7	174+750 LHS slowlane	11/2/2018	1	0.1379	0.0950	0.0543	0.0344	0.0246	0.0134	0.0214	26.3	43
7	174+750 LHS slowlane	11/2/2018	2	0.1347	0.0954	0.0553	0.0386	0.0261	0.0182	0.0140	26.3	43
7	174+750 LHS slowlane	11/2/2018	3	0.1345	0.0953	0.0573	0.0316	0.0227	0.0220	0.0180	26.3	43
7	175+000 LHS slowlane	11/2/2018	1	0.1858	0.1475	0.0932	0.0437	0.0615	0.0531	0.0478	26.3	43
7	175+000 LHS slowlane	11/2/2018	2	0.1887	0.1527	0.0964	0.0606	0.0590	0.0430	0.0320	26.3	43
7	175+000 LHS slowlane	11/2/2018	3	0.1843	0.1503	0.0939	0.0653	0.0571	0.0351	0.0282	26.3	43
7	175+250 LHS slowlane	11/2/2018	1	0.1618	0.1240	0.0755	0.0471	0.0288	0.0144	0.0146	26.2	43
7	175+250 LHS slowlane	11/2/2018	2	0.1629	0.1223	0.0769	0.0503	0.0347	0.0204	0.0185	26.2	43
7	175+250 LHS slowlane	11/2/2018	3	0.1624	0.1195	0.0797	0.0528	0.0312	0.0190	0.0150	26.2	43
7	175+500 LHS slowlane	11/2/2018	1	0.1672	0.1135	0.0614	0.0371	0.0351	0.0175	0.0331	26.2	43
7	175+500 LHS slowlane	11/2/2018	2	0.1676	0.1139	0.0608	0.0346	0.0204	0.0102	0.0051	26.2	43
7	175+500 LHS slowlane	11/2/2018	3	0.1654	0.1161	0.0589	0.0386	0.0234	0.0117	0.0058	26.2	43
7	175+750 LHS slowlane	11/2/2018	1	0.2458	0.1625	0.0997	0.0745	0.0496	0.0280	0.0261	26.2	41.1
7	175+750 LHS slowlane	11/2/2018	2	0.2404	0.1590	0.0991	0.0754	0.0513	0.0254	0.0253	26.2	41.1
7	175+750 LHS slowlane	11/2/2018	3	0.2356	0.1424	0.0937	0.0676	0.0471	0.0243	0.0356	26.2	41.1
7	176+000 LHS slowlane	11/2/2018	1	0.1530	0.0977	0.0731	0.0438	0.0380	0.0266	0.0140	26.2	41.1
7	176+000 LHS slowlane	11/2/2018	2	0.1510	0.1076	0.0787	0.0443	0.0409	0.0274	0.0146	26.2	41.1
7	176+000 LHS slowlane	11/2/2018	3	0.1493	0.1130	0.0767	0.0473	0.0378	0.0279	0.0144	26.2	41.1
7	176+250 LHS slowlane	11/2/2018	1	0.1703	0.0851	0.0690	0.0382	0.0203	0.0123	0.0260	26.3	41.1
7	176+250 LHS slowlane	11/2/2018	2	0.1706	0.0853	0.0716	0.0343	0.0374	0.0136	0.0262	26.3	41.1
7	176+250 LHS slowlane	11/2/2018	3	0.1669	0.1082	0.0704	0.0325	0.0266	0.0133	0.0260	26.2	41.1
7	176+500 LHS slowlane	11/2/2018	1	0.1832	0.1360	0.0864	0.0543	0.0498	0.0249	0.0334	26.3	41.1
7	176+500 LHS slowlane	11/2/2018	2	0.1803	0.1343	0.0792	0.0539	0.0416	0.0326	0.0163	26.3	41.1
7	176+500 LHS slowlane	11/2/2018	3	0.1822	0.1332	0.0828	0.0533	0.0416	0.0280	0.0148	26.2	41.1
7	176+750 LHS slowlane	11/2/2018	1	0.1188	0.0752	0.0424	0.0231	0.0213	0.0106	0.0139	26.3	41.1
7	176+750 LHS slowlane	11/2/2018	2	0.1209	0.0835	0.0448	0.0273	0.0206	0.0103	0.0142	26.3	41.1
7	176+750 LHS slowlane	11/2/2018	3	0.1187	0.0835	0.0460	0.0293	0.0219	0.0256	0.0133	26.3	41.1
7	177+000 LHS slowlane	11/2/2018	1	0.1403	0.1032	0.0620	0.0216	0.0778	0.0324	0.0166	26.3	41.1
7	177+000 LHS slowlane	11/2/2018	2	0.1449	0.1024	0.0637	0.0405	0.0264	0.0221	0.0029	26.3	41.1
7	177+000 LHS slowlane	11/2/2018	3	0.1439	0.1034	0.0613	0.0320	0.0165	0.0331	0.0182	26.3	41.1
7	177+250 LHS slowlane	11/2/2018	1	0.1992	0.1439	0.0737	0.0492	0.0300	0.0292	0.0237	26.2	41.1
7	177+250 LHS slowlane	11/2/2018	2	0.2058	0.1463	0.0856	0.0572	0.0358	0.0251	0.0236	26.2	41.1
7	177+250 LHS slowlane	11/2/2018	3	0.2012	0.1425	0.0854	0.0521	0.0372	0.0275	0.0214	26.2	41.1
7	177+500 LHS slowlane	11/2/2018	1	0.2465	0.1809	0.0976	0.0532	0.0204	0.0328	0.0157	26.3	41.1
7	177+500 LHS slowlane	11/2/2018	2	0.2475	0.1798	0.1047	0.0543	0.0712	0.0315	0.0230	26.3	41.1
7	177+500 LHS slowlane	11/2/2018	3	0.2457	0.1789	0.1060	0.0570	0.0822	0.0332	0.0180	26.3	41.1
7	177+750 LHS slowlane	11/2/2018	1	0.1250	0.0952	0.0478	0.0281	0.0140	0.0070	0.0764	26.3	41.1
7	177+750 LHS slowlane	11/2/2018	2	0.1295	0.0992	0.0547	0.0350	0.0200	0.0127	0.0051	26.3	41.1
7	177+750 LHS slowlane	11/2/2018	3	0.1271	0.0985	0.0550	0.0352	0.0150	0.0162	0.0081	26.3	41.1
7	178+000 LHS slowlane	11/2/2018	1	0.1352	0.1015	0.0590	0.0254	0.0272	0.0174	0.0071	26.3	41.1
7	178+000 LHS slowlane	11/2/2018	2	0.1345	0.0957	0.0553	0.0292	0.0259	0.0186	0.0006	26.3	41.1
7	178+000 LHS slowlane	11/2/2018	3	0.1347	0.0874	0.0512	0.0198	0.0214	0.0175	0.0051	26.3	41.1
7	178+250 LHS slowlane	11/2/2018	1	0.1336	0.1009	0.0613	0.0425	0.0323	0.0250	0.0280	26.2	41.1
7	178+250 LHS slowlane	11/2/2018	2	0.1354	0.1090	0.0659	0.0342	0.0351	0.0261	0.0264	26.2	41.1
7	178+250 LHS slowlane	11/2/2018	3	0.1343	0.1031	0.0609	0.0382	0.0355	0.0224	0.0215	26.2	41.1
7	178+500 LHS slowlane	11/2/2018	1	0.1807	0.1498	0.0815	0.0419	0.0384	0.0365	0.0875	26.2	41.1
7	178+500 LHS slowlane	11/2/2018	2	0.1843	0.1456	0.0828	0.0510	0.0401	0.0278	0.0214	26.2	41.1
7	178+500 LHS slowlane	11/2/2018	3	0.1846	0.1435	0.0835	0.0530	0.0384	0.0307	0.0204	26.2	41.1
7	178+750 LHS slowlane	11/2/2018	1	0.1615	0.1337	0.0804	0.0372	0.0236	0.0290	0.0207	26.2	41.1
7	178+750 LHS slowlane	11/2/2018	2	0.1624	0.1281	0.0788	0.0477	0.0280	0.0258	0.0183	26.2	41.1
7	178+750 LHS slowlane	11/2/2018	3	0.1595	0.1278	0.0815	0.0424	0.0235	0.0279	0.0211	26.2	41.1
7	179+000 LHS slowlane	11/2/2018	1	0.1866	0.1450	0.0743	0.0592	0.0442	0.0221	0.0160	26.2	41.1
7	179+000 LHS slowlane	11/2/2018	2	0.1891	0.1420	0.0762	0.0601	0.0424	0.0212	0.0177	26.2	41.1
7	179+000 LHS slowlane	11/2/2018	3	0.1857	0.1461	0.0753	0.0615	0.0455	0.0227	0.0223	26.1	41.1
7	179+250 LHS slowlane	11/2/2018	1	0.1591	0.1044	0.0633	0.0538	0.0296	0.0249	0.0203	26.2	41.1
7	179+250 LHS slowlane	11/2/2018	2	0.1552	0.0871	0.0736	0.0538	0.0272	0.0271	0.0200	26.2	41.1
7	179+250 LHS slowlane	11/2/2018	3	0.1511	0.0755	0.0652	0.0556	0.0267	0.0333	0.0150	26.2	41.1
7	179+500 LHS slowlane	11/2/2018	1	0.1433	0.0974	0.0678	0.0532	0.0379	0.0235	0.0244	26.2	41.1
7	179+500 LHS slowlane	11/2/2018	2	0.1419	0.0693	0.0696	0.0533	0.0366	0.0271	0.0193	26.2	41.1
7	179+500 LHS slowlane	11/2/2018	3	0.1432	0.1014	0.0678	0.0469	0.0339	0.0248	0.0200	26.2	41.1
7	179+750 LHS slowlane	11/2/2018	1	0.1402	0.1016	0.0589	0.0294	0.0147	0.0218	0.0109	26.2	41.1
7	179+750 LHS slowlane	11/2/2018	2	0.1432	0.1047	0.0604	0.0302	0.0151	0.0225	0.0112	26.2	41.1
7	179+750 LHS slowlane	11/2/2018	3	0.1423	0.1033	0.0564	0.0110	0.0055	0.0233	0.0116	26.2	41.1
7	180+000 LHS slowlane	11/2/2018	1	0.1643	0.1201	0.0612	0.0389	0.0276	0.0204	0.0019	26.2	41.1
7	180+000 LHS slowlane	11/2/2018	2	0.1643	0.1207	0.0614	0.0394	0.0291	0.0205	0.0102	26.2	41.1
7	180+000 LHS slowlane	11/2/2018	3	0.1665	0.1231	0.0683	0.0476	0.0323	0.0228	0.0187	26.2	41.1
7	180+250 LHS slowlane	11/2/2018	1	0.1749	0.1156	0.0733	0.0476	0.0238	0.0396	0.0228	26.1	41.1
7	180+250 LHS slowlane	11/2/2018	2	0.1803	0.1315	0.0790	0.0584	0.0386	0.0368	0.0293	26.1	41.1
7	180+250 LHS slowlane	11/2/2018	3	0.1835	0.1278	0.0858	0.0598	0.0419	0.0238	0.0259	26.1	41.1
7	180+500 LHS slowlane	11/2/2018	1	0.2145	0.1523	0.0805	0.0523	0.0385	0.0283	0.0346	26.1	41.1
7	180+500 LHS slowlane	11/2/2018	2	0.2115	0.1495	0.0819	0.0533	0.0424	0.0284	0.0284	26.1	41.1
7	180+500 LHS slowlane	11/2/2018	3	0.2034	0.1526	0.0865	0.0538	0.0412	0.0265	0.0314	26.1	41.1
7	180+750 LHS slowlane	11/2/2018	1	0.1360	0.0966	0.0613	0.0423	0.0295	0.0062	0.0031	26.1	41.1
7	180+750 LHS slowlane	11/2/2018	2	0.1345	0.0973	0.0614	0.0421	0.0294	0.0149	0.0152	26.1	41.1
7	180+750 LHS slowlane	11/2/2018	3	0.1245	0.0975	0.0624	0.0349	0.0247	0.0147	0.0125	26.1	41.1

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	181+000 LHS slowlane	11/2/2018	1	0.1781	0.1303	0.0695	0.0395	0.0438	0.0120	0.0204	26.1	41.1
7	181+000 LHS slowlane	11/2/2018	2	0.1760	0.1253	0.0711	0.0387	0.0456	0.0148	0.0226	26.1	41.1
7	181+000 LHS slowlane	11/2/2018	3	0.1760	0.1236	0.0719	0.0394	0.0440	0.0192	0.0210	26.1	41.1
7	181+250 LHS slowlane	11/2/2018	1	0.2100	0.1452	0.0949	0.0342	0.0355	0.0656	0.0184	26.1	41.1
7	181+250 LHS slowlane	11/2/2018	2	0.2083	0.1397	0.0960	0.0415	0.0401	0.0216	0.0011	26.1	41.1
7	181+250 LHS slowlane	11/2/2018	3	0.2105	0.1471	0.0970	0.0400	0.0367	0.0300	0.0045	26.1	41.1
7	181+500 LHS slowlane	11/2/2018	1	0.1402	0.0909	0.0501	0.0203	0.0225	0.0208	0.0104	26.1	41.1
7	181+500 LHS slowlane	11/2/2018	2	0.1389	0.0896	0.0485	0.0312	0.0232	0.0121	0.0145	26.1	41.1
7	181+500 LHS slowlane	11/2/2018	3	0.1413	0.0897	0.0569	0.0231	0.0260	0.0206	0.0222	26.1	41.1
7	181+750 LHS slowlane	11/2/2018	1	0.1407	0.1036	0.0638	0.0364	0.0257	0.0128	0.0188	26.0	41.1
7	181+750 LHS slowlane	11/2/2018	2	0.1436	0.1006	0.0632	0.0345	0.0266	0.0133	0.0333	26.1	41.1
7	181+750 LHS slowlane	11/2/2018	3	0.1079	0.0926	0.0591	0.0408	0.0224	0.0112	0.0205	26.0	41.1
7	182+000 LHS slowlane	11/2/2018	1	0.1868	0.1309	0.0750	0.0532	0.0346	0.0249	0.0195	26.1	41.1
7	182+000 LHS slowlane	11/2/2018	2	0.1824	0.1288	0.0775	0.0493	0.0341	0.0264	0.0251	26.1	41.1
7	182+000 LHS slowlane	11/2/2018	3	0.1831	0.1306	0.0794	0.0483	0.0362	0.0268	0.0240	26.1	41.1
7	182+250 LHS slowlane	11/2/2018	1	0.1136	0.0815	0.0559	0.0258	0.0248	0.0124	0.0261	26.1	41.1
7	182+250 LHS slowlane	11/2/2018	2	0.1147	0.0809	0.0561	0.0344	0.0274	0.0137	0.0157	26.1	41.1
7	182+250 LHS slowlane	11/2/2018	3	0.1141	0.0818	0.0562	0.0329	0.0302	0.0171	0.0137	26.1	41.1
7	182+500 LHS slowlane	11/2/2018	1	0.1365	0.0958	0.0519	0.0413	0.0273	0.0136	0.0162	26.1	41.1
7	182+500 LHS slowlane	11/2/2018	2	0.1389	0.0972	0.0543	0.0407	0.0283	0.0218	0.0183	26.1	41.1
7	182+500 LHS slowlane	11/2/2018	3	0.1366	0.0955	0.0545	0.0402	0.0277	0.0266	0.0162	26.1	41.1
7	182+750 LHS slowlane	11/2/2018	1	0.1409	0.1084	0.0575	0.0373	0.0334	0.0251	0.1042	26.1	41.1
7	182+750 LHS slowlane	11/2/2018	2	0.1426	0.1099	0.0558	0.0396	0.0361	0.0168	0.0024	26.1	41.1
7	182+750 LHS slowlane	11/2/2018	3	0.1394	0.1047	0.0586	0.0396	0.0334	0.0169	0.0084	26.1	41.1
7	183+000 LHS slowlane	11/2/2018	1	0.1603	0.1129	0.0849	0.0486	0.0284	0.0226	0.0264	26.1	41.1
7	183+000 LHS slowlane	11/2/2018	2	0.1586	0.1147	0.0761	0.0464	0.0296	0.0190	0.0234	26.2	41.1
7	183+000 LHS slowlane	11/2/2018	3	0.1556	0.1173	0.0751	0.0477	0.0296	0.0194	0.0192	26.2	41.1
7	183+250 LHS slowlane	11/2/2018	1	0.1450	0.1115	0.0575	0.0269	0.0319	0.0274	0.0257	26.3	41.1
7	183+250 LHS slowlane	11/2/2018	2	0.1426	0.1082	0.0561	0.0293	0.0146	0.0245	0.0241	26.2	41.1
7	183+250 LHS slowlane	11/2/2018	3	0.1438	0.0832	0.0605	0.0364	0.0355	0.0253	0.0332	26.2	41.1
7	183+500 LHS slowlane	11/2/2018	1	0.1528	0.0764	0.0647	0.0269	0.0465	0.0287	0.0200	26.3	41.1
7	183+500 LHS slowlane	11/2/2018	2	0.1576	0.1159	0.0680	0.0340	0.0479	0.0256	0.0206	26.3	41.1
7	183+500 LHS slowlane	11/2/2018	3	0.1554	0.1110	0.0663	0.0331	0.0235	0.0258	0.0389	26.3	41.1
7	183+750 LHS slowlane	11/2/2018	1	0.1916	0.1380	0.0886	0.0510	0.0340	0.0123	0.0159	26.3	41.1
7	183+750 LHS slowlane	11/2/2018	2	0.1889	0.1441	0.0897	0.0524	0.0404	0.0138	0.0189	26.2	41.1
7	183+750 LHS slowlane	11/2/2018	3	0.1913	0.1408	0.0869	0.0552	0.0378	0.0269	0.0232	26.2	41.1
7	184+000 LHS slowlane	11/2/2018	1	0.1587	0.1284	0.0869	0.0456	0.0228	0.0114	0.0303	26.3	41.1
7	184+000 LHS slowlane	11/2/2018	2	0.1562	0.1276	0.0887	0.0428	0.0214	0.0389	0.0155	26.3	41.1
7	184+000 LHS slowlane	11/2/2018	3	0.1588	0.1263	0.0817	0.0532	0.0424	0.0169	0.0189	26.3	41.1
7	184+250 LHS slowlane	11/2/2018	1	0.1553	0.1163	0.0713	0.0234	0.0338	0.0446	0.0223	26.3	41.1
7	184+250 LHS slowlane	11/2/2018	2	0.1583	0.1165	0.0728	0.0364	0.0372	0.0077	0.0038	26.3	41.1
7	184+250 LHS slowlane	11/2/2018	3	0.1592	0.1147	0.0716	0.0439	0.0375	0.0122	0.0061	26.3	41.1
7	184+500 LHS slowlane	11/2/2018	1	0.1649	0.1217	0.0735	0.0391	0.0260	0.0223	0.0111	26.3	41.1
7	184+500 LHS slowlane	11/2/2018	2	0.1684	0.1235	0.0736	0.0417	0.0296	0.0220	0.0110	26.3	41.1
7	184+500 LHS slowlane	11/2/2018	3	0.1656	0.1212	0.0733	0.0417	0.0260	0.0230	0.0115	26.3	41.1
7	184+750 LHS slowlane	11/2/2018	1	0.3256	0.2091	0.0891	0.0527	0.0396	0.0211	0.0190	26.2	38.4
7	184+750 LHS slowlane	11/2/2018	2	0.3199	0.2091	0.0909	0.0506	0.0410	0.0256	0.0230	26.2	38.4
7	184+750 LHS slowlane	11/2/2018	3	0.3135	0.2059	0.0918	0.0555	0.0440	0.0199	0.0179	26.2	38.4
7	185+000 LHS slowlane	12/2/2018	1	0.1779	0.1355	0.0750	0.0299	0.0252	0.1629	0.0171	25.2	32.6
7	185+000 LHS slowlane	12/2/2018	2	0.1768	0.1350	0.0754	0.0283	0.0283	0.0231	0.0228	25.2	32.6
7	185+000 LHS slowlane	12/2/2018	3	0.1658	0.1240	0.0748	0.0247	0.0215	0.0121	0.0117	25.2	32.6
7	185+250 LHS slowlane	12/2/2018	1	0.1909	0.1439	0.0738	0.0457	0.0308	0.0241	0.0366	25.1	32.6
7	185+250 LHS slowlane	12/2/2018	2	0.1903	0.1362	0.0775	0.0515	0.0349	0.0308	0.0202	25.1	32.6
7	185+250 LHS slowlane	12/2/2018	3	0.1899	0.1343	0.0765	0.0479	0.0288	0.0273	0.0214	25.1	32.6
7	185+500 LHS slowlane	12/2/2018	1	0.2189	0.1512	0.0949	0.0579	0.0438	0.0312	0.0258	25.2	32.6
7	185+500 LHS slowlane	12/2/2018	2	0.2158	0.1489	0.0949	0.0547	0.0438	0.0286	0.0277	25.2	32.6
7	185+500 LHS slowlane	12/2/2018	3	0.2173	0.1554	0.0978	0.0568	0.0465	0.0264	0.0249	25.2	32.6
7	185+750 LHS slowlane	12/2/2018	1	0.1143	0.0896	0.0610	0.0414	0.0316	0.0222	0.0194	25.3	32.6
7	185+750 LHS slowlane	12/2/2018	2	0.1151	0.0894	0.0611	0.0454	0.0321	0.0226	0.0186	25.3	32.6
7	185+750 LHS slowlane	12/2/2018	3	0.1135	0.0880	0.0606	0.0448	0.0330	0.0235	0.0184	25.3	32.6
7	186+000 LHS slowlane	12/2/2018	1	0.2003	0.1449	0.0876	0.0647	0.0409	0.0300	0.0233	25.3	32.6
7	186+000 LHS slowlane	12/2/2018	2	0.1985	0.1428	0.0867	0.0676	0.0435	0.0307	0.0265	25.3	32.6
7	186+000 LHS slowlane	12/2/2018	3	0.1950	0.1445	0.0889	0.0663	0.0437	0.0302	0.0263	25.2	32.6
7	186+250 LHS slowlane	12/2/2018	1	0.1706	0.1230	0.0757	0.0535	0.0386	0.0269	0.0247	25.2	32.6
7	186+250 LHS slowlane	12/2/2018	2	0.1658	0.1176	0.0734	0.0522	0.0387	0.0283	0.0263	25.2	32.6
7	186+250 LHS slowlane	12/2/2018	3	0.1597	0.1143	0.0706	0.0504	0.0380	0.0269	0.0239	25.2	32.6
7	186+500 LHS slowlane	12/2/2018	1	0.1107	0.0913	0.0673	0.0508	0.0390	0.0257	0.0181	25.3	32.6
7	186+500 LHS slowlane	12/2/2018	2	0.1084	0.0898	0.0681	0.0526	0.0384	0.0272	0.0191	25.4	32.6
7	186+500 LHS slowlane	12/2/2018	3	0.1045	0.0848	0.0642	0.0524	0.0312	0.0247	0.0187	25.4	32.6
7	186+750 LHS slowlane	12/2/2018	1	0.2204	0.1594	0.0971	0.0638	0.0513	0.0354	0.0274	25.3	32.6
7	186+750 LHS slowlane	12/2/2018	2	0.2228	0.1608	0.0985	0.0663	0.0515	0.0367	0.0292	25.4	32.6
7	186+750 LHS slowlane	12/2/2018	3	0.2182	0.1614	0.0990	0.0669	0.0523	0.0376	0.0306	25.3	32.6
7	187+000 LHS slowlane	12/2/2018	1	0.1838	0.1291	0.0833	0.0610	0.0447	0.0340	0.0290	25.4	32.6
7	187+000 LHS slowlane	12/2/2018	2	0.1762	0.1283	0.0803	0.0610	0.0458	0.0331	0.0280	25.4	32.6
7	187+000 LHS slowlane	12/2/2018	3	0.1750	0.1290	0.0815	0.0621	0.0465	0.0349	0.0291	25.5	32.6
7	187+250 LHS slowlane	12/2/2018	1	0.1737	0.1230	0.0793	0.0572	0.0465	0.0365	0.0334	25.4	32.6

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	187+250 LHS slowlane	12/2/2018	2	0.1760	0.1252	0.0824	0.0582	0.0459	0.0349	0.0300	25.5	32.6
7	187+250 LHS slowlane	12/2/2018	3	0.1724	0.1240	0.0794	0.0591	0.0435	0.0353	0.0276	25.4	32.6
7	187+500 LHS slowlane	12/2/2018	1	0.1462	0.1106	0.0736	0.0524	0.0414	0.0325	0.0255	25.5	32.6
7	187+500 LHS slowlane	12/2/2018	2	0.1425	0.1112	0.0731	0.0533	0.0424	0.0320	0.0244	25.5	32.6
7	187+500 LHS slowlane	12/2/2018	3	0.1395	0.1060	0.0719	0.0515	0.0428	0.0310	0.0245	25.5	32.6
7	187+750 LHS slowlane	12/2/2018	1	0.2128	0.1668	0.1114	0.0805	0.0593	0.0422	0.0299	25.6	32.6
7	187+750 LHS slowlane	12/2/2018	2	0.2070	0.1637	0.1114	0.0821	0.0604	0.0421	0.0308	25.6	32.6
7	187+750 LHS slowlane	12/2/2018	3	0.2028	0.1627	0.1109	0.0805	0.0603	0.0421	0.0330	25.6	32.6
7	188+000 LHS slowlane	12/2/2018	1	0.1698	0.1312	0.0778	0.0543	0.0369	0.0464	0.0244	25.6	32.6
7	188+000 LHS slowlane	12/2/2018	2	0.1683	0.1292	0.0787	0.0530	0.0385	0.0291	0.0276	25.6	32.6
7	188+000 LHS slowlane	12/2/2018	3	0.1695	0.1285	0.0794	0.0542	0.0394	0.0193	0.0257	25.6	32.6
7	188+250 LHS slowlane	12/2/2018	1	0.1142	0.0921	0.0616	0.0456	0.0349	0.0296	0.0162	25.6	32.6
7	188+250 LHS slowlane	12/2/2018	2	0.1134	0.0882	0.0605	0.0452	0.0364	0.0291	0.0236	25.6	32.6
7	188+250 LHS slowlane	12/2/2018	3	0.1151	0.0868	0.0603	0.0444	0.0334	0.0272	0.0227	25.5	32.6
7	188+500 LHS slowlane	12/2/2018	1	0.1349	0.1066	0.0746	0.0567	0.0435	0.0325	0.0255	25.5	32.6
7	188+500 LHS slowlane	12/2/2018	2	0.1326	0.1052	0.0728	0.0542	0.0427	0.0325	0.0256	25.5	32.6
7	188+500 LHS slowlane	12/2/2018	3	0.1323	0.1070	0.0735	0.0566	0.0424	0.0329	0.0250	25.5	32.6
7	188+750 LHS slowlane	12/2/2018	1	0.1387	0.1082	0.0710	0.0510	0.0356	0.0279	0.0250	25.6	32.6
7	188+750 LHS slowlane	12/2/2018	2	0.1410	0.1097	0.0727	0.0528	0.0404	0.0289	0.0231	25.6	32.6
7	188+750 LHS slowlane	12/2/2018	3	0.1420	0.1086	0.0719	0.0526	0.0409	0.0310	0.0231	25.6	32.6
7	189+000 LHS slowlane	12/2/2018	1	0.1435	0.1101	0.0689	0.0459	0.0084	0.0235	0.0191	25.7	32.6
7	189+000 LHS slowlane	12/2/2018	2	0.1406	0.1088	0.0692	0.0480	0.0344	0.0243	0.0207	25.7	32.6
7	189+000 LHS slowlane	12/2/2018	3	0.1414	0.1119	0.0694	0.0490	0.0350	0.0250	0.0178	25.7	32.6
7	189+250 LHS slowlane	12/2/2018	1	0.1567	0.1227	0.0780	0.0562	0.0430	0.0296	0.0249	25.6	32.6
7	189+250 LHS slowlane	12/2/2018	2	0.1541	0.1219	0.0799	0.0553	0.0411	0.0323	0.0275	25.6	32.6
7	189+250 LHS slowlane	12/2/2018	3	0.1573	0.1236	0.0800	0.0562	0.0413	0.0315	0.0274	25.6	32.6
7	189+500 LHS slowlane	12/2/2018	1	0.1783	0.1319	0.0782	0.0475	0.0436	0.0265	0.0207	25.6	32.6
7	189+500 LHS slowlane	12/2/2018	2	0.1711	0.1290	0.0771	0.0478	0.0393	0.0264	0.0188	25.5	32.6
7	189+500 LHS slowlane	12/2/2018	3	0.1695	0.1263	0.0781	0.0521	0.0403	0.0294	0.0201	25.5	32.6
7	189+750 LHS slowlane	12/2/2018	1	0.1239	0.0887	0.0550	0.0374	0.0300	0.0143	0.0197	25.6	32.6
7	189+750 LHS slowlane	12/2/2018	2	0.1222	0.0882	0.0579	0.0435	0.0370	0.0168	0.0057	25.5	32.6
7	189+750 LHS slowlane	12/2/2018	3	0.1207	0.0865	0.0579	0.0437	0.0327	0.0218	0.0216	25.5	32.6
7	190+000 LHS slowlane	12/2/2018	1	0.1590	0.1122	0.0629	0.0469	0.0331	0.0198	0.0118	25.5	32.6
7	190+000 LHS slowlane	12/2/2018	2	0.1559	0.1106	0.0689	0.0452	0.0338	0.0209	0.0138	25.6	32.6
7	190+000 LHS slowlane	12/2/2018	3	0.1535	0.1146	0.0694	0.0485	0.0280	0.0430	0.0215	25.5	32.6
7	190+250 LHS slowlane	12/2/2018	1	0.1169	0.0849	0.0551	0.0359	0.0209	0.0104	0.0052	25.5	32.6
7	190+250 LHS slowlane	12/2/2018	2	0.1173	0.0833	0.0568	0.0394	0.0211	0.0105	0.0146	25.5	32.6
7	190+250 LHS slowlane	12/2/2018	3	0.1141	0.0870	0.0588	0.0463	0.0283	0.0143	0.0071	25.5	32.6
7	190+500 LHS slowlane	12/2/2018	1	0.1778	0.1164	0.0654	0.0383	0.0281	0.0205	0.0158	25.5	32.6
7	190+500 LHS slowlane	12/2/2018	2	0.1807	0.1208	0.0663	0.0447	0.0302	0.0244	0.0180	25.5	32.6
7	190+500 LHS slowlane	12/2/2018	3	0.1788	0.1196	0.0670	0.0437	0.0331	0.0240	0.0195	25.5	32.6
7	190+750 LHS slowlane	12/2/2018	1	0.1318	0.0943	0.0570	0.0380	0.0302	0.0165	0.0082	25.6	32.6
7	190+750 LHS slowlane	12/2/2018	2	0.1293	0.0921	0.0559	0.0379	0.0303	0.0166	0.0119	25.6	32.6
7	190+750 LHS slowlane	12/2/2018	3	0.1260	0.0919	0.0553	0.0341	0.0313	0.0149	0.0067	25.6	32.6
7	191+000 LHS slowlane	12/2/2018	1	0.1964	0.1374	0.0751	0.0532	0.0323	0.0198	0.0240	25.8	32.6
7	191+000 LHS slowlane	12/2/2018	2	0.1960	0.1422	0.0833	0.0570	0.0276	0.0138	0.0199	25.8	32.6
7	191+000 LHS slowlane	12/2/2018	3	0.1933	0.1418	0.0773	0.0571	0.0301	0.0165	0.0231	25.8	32.6
7	191+250 LHS slowlane	12/2/2018	1	0.2212	0.1606	0.0964	0.0599	0.0350	0.0273	0.0204	25.7	32.6
7	191+250 LHS slowlane	12/2/2018	2	0.2165	0.1575	0.0932	0.0609	0.0398	0.0306	0.0228	25.7	32.6
7	191+250 LHS slowlane	12/2/2018	3	0.2178	0.1611	0.0936	0.0604	0.0395	0.0310	0.0246	25.7	32.6
7	191+500 LHS slowlane	12/2/2018	1	0.1957	0.1318	0.0738	0.0430	0.0286	0.0263	0.0241	25.7	32.6
7	191+500 LHS slowlane	12/2/2018	2	0.1928	0.1319	0.0750	0.0421	0.0339	0.0230	0.0248	25.6	32.6
7	191+500 LHS slowlane	12/2/2018	3	0.1938	0.1385	0.0753	0.0402	0.0372	0.0225	0.0207	25.6	32.6
7	191+750 LHS slowlane	12/2/2018	1	0.1158	0.0903	0.0560	0.0356	0.0263	0.0147	0.0152	25.7	32.6
7	191+750 LHS slowlane	12/2/2018	2	0.1147	0.0904	0.0552	0.0338	0.0254	0.0714	0.0196	25.7	32.6
7	191+750 LHS slowlane	12/2/2018	3	0.1155	0.0945	0.0553	0.0345	0.0282	0.0139	0.0142	25.7	32.6
7	192+000 LHS slowlane	12/2/2018	1	0.1208	0.0816	0.0534	0.0277	0.0223	0.0135	0.0016	25.8	32.6
7	192+000 LHS slowlane	12/2/2018	2	0.1243	0.0829	0.0573	0.0309	0.0213	0.0151	0.0149	25.8	32.6
7	192+000 LHS slowlane	12/2/2018	3	0.1190	0.0830	0.0552	0.0312	0.0213	0.0145	0.0072	25.8	32.6
7	192+250 LHS slowlane	12/2/2018	1	0.1670	0.1186	0.0644	0.0570	0.0496	0.0248	0.0169	25.9	32.6
7	192+250 LHS slowlane	12/2/2018	2	0.1632	0.1226	0.0699	0.0570	0.0368	0.0166	0.0296	25.8	32.6
7	192+250 LHS slowlane	12/2/2018	3	0.1657	0.1182	0.0700	0.0579	0.0438	0.0167	0.0193	25.9	32.6
7	192+500 LHS slowlane	12/2/2018	1	0.1255	0.1009	0.0674	0.0484	0.0349	0.0268	0.0188	25.9	32.6
7	192+500 LHS slowlane	12/2/2018	2	0.1221	0.0988	0.0653	0.0513	0.0330	0.0277	0.0188	25.9	32.6
7	192+500 LHS slowlane	12/2/2018	3	0.1220	0.0985	0.0624	0.0428	0.0314	0.0248	0.0157	25.9	32.6
7	192+750 LHS slowlane	12/2/2018	1	0.1575	0.1187	0.0639	0.0490	0.0231	0.0165	0.0247	25.7	36.5
7	192+750 LHS slowlane	12/2/2018	2	0.1590	0.1195	0.0660	0.0499	0.0274	0.0179	0.0168	25.7	36.5
7	192+750 LHS slowlane	12/2/2018	3	0.1603	0.1190	0.0704	0.0497	0.0293	0.0177	0.0192	25.7	36.5
7	193+000 LHS slowlane	12/2/2018	1	0.1501	0.1083	0.0697	0.0476	0.0249	0.0185	0.0092	25.7	36.5
7	193+000 LHS slowlane	12/2/2018	2	0.1509	0.1134	0.0714	0.0522	0.0263	0.0172	0.0137	25.7	36.5
7	193+000 LHS slowlane	12/2/2018	3	0.1498	0.1158	0.0709	0.0501	0.0295	0.0204	0.0166	25.7	36.5
7	193+250 LHS slowlane	12/2/2018	1	0.1342	0.1024	0.0668	0.0495	0.0335	0.0256	0.0216	25.7	36.5
7	193+250 LHS slowlane	12/2/2018	2	0.1331	0.0976	0.0542	0.0555	0.0320	0.0272	0.0343	25.7	36.5
7	193+250 LHS slowlane	12/2/2018	3	0.1352	0.0978	0.0640	0.0542	0.0381	0.0301	0.0306	25.7	36.5
7	193+500 LHS slowlane	12/2/2018	1	0.1319	0.0961	0.0600	0.0372	0.0298	0.0182	0.0150	25.8	36.5
7	193+500 LHS slowlane	12/2/2018	2	0.1311	0.0925	0.0607	0.0357	0.0292	0.0173	0.0191	25.8	36.5

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	193+500 LHS slowlane	12/2/2018	3	0.1306	0.0989	0.0601	0.0411	0.0302	0.0219	0.0184	25.8	36.5
7	193+750 LHS slowlane	12/2/2018	1	0.1955	0.1389	0.0747	0.0466	0.0373	0.0159	0.0199	25.8	36.5
7	193+750 LHS slowlane	12/2/2018	2	0.1957	0.1396	0.0765	0.0484	0.0394	0.0155	0.0215	25.8	36.5
7	193+750 LHS slowlane	12/2/2018	3	0.1955	0.1384	0.0733	0.0412	0.0355	0.0158	0.0197	25.8	36.5
7	194+000 LHS slowlane	12/2/2018	1	0.1273	0.1011	0.0641	0.0402	0.0299	0.0223	0.0130	25.9	36.5
7	194+000 LHS slowlane	12/2/2018	2	0.1246	0.0967	0.0628	0.0423	0.0288	0.0219	0.0159	25.9	36.5
7	194+000 LHS slowlane	12/2/2018	3	0.1257	0.0978	0.0637	0.0409	0.0297	0.0251	0.0125	25.9	36.5
7	194+250 LHS slowlane	12/2/2018	1	0.1903	0.1386	0.0819	0.0550	0.0384	0.0296	0.0226	25.9	36.5
7	194+250 LHS slowlane	12/2/2018	2	0.1884	0.1371	0.0831	0.0552	0.0380	0.0309	0.0123	25.9	36.5
7	194+250 LHS slowlane	12/2/2018	3	0.1865	0.1352	0.0831	0.0545	0.0362	0.0302	0.0132	25.9	36.5
7	194+500 LHS slowlane	12/2/2018	1	0.1763	0.1308	0.0783	0.0526	0.0383	0.0292	0.0221	26.0	36.5
7	194+500 LHS slowlane	12/2/2018	2	0.1731	0.1293	0.0783	0.0514	0.0382	0.0288	0.0226	26.0	36.5
7	194+500 LHS slowlane	12/2/2018	3	0.1731	0.1318	0.0786	0.0543	0.0397	0.0297	0.0246	26.0	36.5
7	194+750 LHS slowlane	12/2/2018	1	0.2208	0.1596	0.0919	0.0565	0.0470	0.0312	0.0233	26.1	36.5
7	194+750 LHS slowlane	12/2/2018	2	0.2134	0.1560	0.0947	0.0508	0.0432	0.0250	0.0223	26.1	36.5
7	194+750 LHS slowlane	12/2/2018	3	0.2185	0.1535	0.0930	0.0532	0.0433	0.0295	0.0244	26.1	36.5
7	195+000 LHS slowlane	12/2/2018	1	0.1008	0.0754	0.0481	0.0330	0.0256	0.0223	0.0003	26.1	36.5
7	195+000 LHS slowlane	12/2/2018	2	0.1005	0.0755	0.0475	0.0348	0.0267	0.0211	0.0146	26.1	36.5
7	195+000 LHS slowlane	12/2/2018	3	0.1011	0.0748	0.0493	0.0351	0.0266	0.0208	0.0160	26.1	36.5
7	195+250 LHS slowlane	12/2/2018	1	0.0888	0.0616	0.0367	0.0254	0.0216	0.0165	0.0167	26.0	36.5
7	195+250 LHS slowlane	12/2/2018	2	0.0886	0.0645	0.0381	0.0243	0.0226	0.0168	0.0153	25.9	36.5
7	195+250 LHS slowlane	12/2/2018	3	0.0879	0.0653	0.0405	0.0268	0.0236	0.0184	0.0165	25.9	36.5
7	195+500 LHS slowlane	12/2/2018	1	0.1400	0.0935	0.0585	0.0398	0.0346	0.0173	0.0254	25.8	36.5
7	195+500 LHS slowlane	12/2/2018	2	0.1385	0.0946	0.0574	0.0407	0.0332	0.0181	0.0218	25.8	36.5
7	195+500 LHS slowlane	12/2/2018	3	0.1417	0.0961	0.0567	0.0441	0.0316	0.0244	0.0207	25.8	36.5
7	195+750 LHS slowlane	12/2/2018	1	0.1883	0.1372	0.0996	0.0659	0.0613	0.0454	0.0229	26.0	36.5
7	195+750 LHS slowlane	12/2/2018	2	0.1873	0.1387	0.1008	0.0599	0.0594	0.0446	0.0171	26.0	36.5
7	195+750 LHS slowlane	12/2/2018	3	0.1841	0.1357	0.0972	0.0670	0.0593	0.0496	0.0217	26.0	36.5
7	196+000 LHS slowlane	12/2/2018	1	0.1704	0.1068	0.0608	0.0413	0.0303	0.0199	0.0187	26.1	36.5
7	196+000 LHS slowlane	12/2/2018	2	0.1650	0.1036	0.0597	0.0444	0.0346	0.0196	0.0173	26.1	36.5
7	196+000 LHS slowlane	12/2/2018	3	0.1653	0.1053	0.0587	0.0440	0.0310	0.0200	0.0172	26.1	36.5
7	196+250 LHS slowlane	12/2/2018	1	0.1240	0.0815	0.0424	0.0250	0.0125	0.0177	0.0207	26.2	36.5
7	196+250 LHS slowlane	12/2/2018	2	0.1280	0.0863	0.0493	0.0294	0.0290	0.0222	0.0229	26.1	36.5
7	196+250 LHS slowlane	12/2/2018	3	0.1285	0.0884	0.0523	0.0351	0.0324	0.0217	0.0200	26.1	36.5
7	196+500 LHS slowlane	12/2/2018	1	0.1370	0.0938	0.0630	0.0393	0.0308	0.0295	0.0175	26.2	36.5
7	196+500 LHS slowlane	12/2/2018	2	0.1382	0.0963	0.0605	0.0377	0.0302	0.0280	0.0217	26.1	36.5
7	196+500 LHS slowlane	12/2/2018	3	0.1382	0.0958	0.0593	0.0364	0.0295	0.0229	0.0198	26.1	36.5
7	196+750 LHS slowlane	12/2/2018	1	0.2615	0.1773	0.0860	0.0430	0.0372	0.0304	0.0211	26.1	36.5
7	196+750 LHS slowlane	12/2/2018	2	0.2593	0.1738	0.0876	0.0512	0.0350	0.0327	0.0215	26.1	36.5
7	196+750 LHS slowlane	12/2/2018	3	0.2564	0.1694	0.0903	0.0579	0.0440	0.0335	0.0169	26.1	36.5
7	197+000 LHS slowlane	12/2/2018	1	0.1745	0.1338	0.0731	0.0544	0.0389	0.0177	0.0202	26.3	36.5
7	197+000 LHS slowlane	12/2/2018	2	0.1720	0.1311	0.0735	0.0553	0.0384	0.0189	0.0206	26.3	36.5
7	197+000 LHS slowlane	12/2/2018	3	0.1721	0.1327	0.0750	0.0539	0.0388	0.0239	0.0200	26.3	36.5
7	197+250 LHS slowlane	12/2/2018	1	0.1999	0.1509	0.0912	0.0637	0.0499	0.0260	0.0234	26.5	36.5
7	197+250 LHS slowlane	12/2/2018	2	0.1975	0.1505	0.0950	0.0642	0.0437	0.0264	0.0254	26.5	36.5
7	197+250 LHS slowlane	12/2/2018	3	0.1977	0.1511	0.0937	0.0651	0.0457	0.0315	0.0249	26.5	36.5
7	197+500 LHS slowlane	12/2/2018	1	0.2035	0.1457	0.0835	0.0515	0.0386	0.0286	0.0221	26.4	36.5
7	197+500 LHS slowlane	12/2/2018	2	0.2040	0.1426	0.0829	0.0558	0.0390	0.0286	0.0235	26.4	36.5
7	197+500 LHS slowlane	12/2/2018	3	0.2038	0.1432	0.0852	0.0558	0.0404	0.0297	0.0250	26.4	36.5
7	197+750 LHS slowlane	12/2/2018	1	0.1963	0.1419	0.0860	0.0382	0.0434	0.0213	0.0242	26.4	36.5
7	197+750 LHS slowlane	12/2/2018	2	0.1930	0.1425	0.0906	0.0386	0.0405	0.0194	0.0260	26.4	36.5
7	197+750 LHS slowlane	12/2/2018	3	0.1914	0.1422	0.0884	0.0376	0.0420	0.0152	0.0275	26.4	36.5
7	198+000 LHS slowlane	12/2/2018	1	0.2066	0.1469	0.0905	0.0534	0.0430	0.0211	0.0195	26.4	36.5
7	198+000 LHS slowlane	12/2/2018	2	0.2007	0.1438	0.0870	0.0519	0.0423	0.0184	0.0213	26.4	36.5
7	198+000 LHS slowlane	12/2/2018	3	0.2021	0.1461	0.0873	0.0555	0.0423	0.0218	0.0217	26.4	36.5
7	198+250 LHS slowlane	12/2/2018	1	0.1502	0.1072	0.0648	0.0317	0.0306	0.0190	0.0150	26.3	36.5
7	198+250 LHS slowlane	12/2/2018	2	0.1517	0.1079	0.0645	0.0447	0.0297	0.0224	0.0142	26.2	36.5
7	198+250 LHS slowlane	12/2/2018	3	0.1477	0.1089	0.0660	0.0458	0.0323	0.0213	0.0159	26.2	36.5
7	198+500 LHS slowlane	12/2/2018	1	0.1421	0.0952	0.0654	0.0411	0.0288	0.0171	0.0149	26.2	36.5
7	198+500 LHS slowlane	12/2/2018	2	0.1417	0.1023	0.0679	0.0416	0.0298	0.0152	0.0076	26.2	36.5
7	198+500 LHS slowlane	12/2/2018	3	0.1381	0.0984	0.0638	0.0414	0.0286	0.0179	0.0169	26.2	36.5
7	198+750 LHS slowlane	12/2/2018	1	0.1789	0.1283	0.0713	0.0370	0.0253	0.0209	0.0286	26.3	36.5
7	198+750 LHS slowlane	12/2/2018	2	0.1751	0.1263	0.0687	0.0390	0.0247	0.0211	0.0268	26.3	36.5
7	198+750 LHS slowlane	12/2/2018	3	0.1740	0.1224	0.0692	0.0433	0.0231	0.0243	0.0271	26.3	36.5
7	199+000 LHS slowlane	12/2/2018	1	0.1477	0.1122	0.0662	0.0380	0.0323	0.0225	0.0161	26.2	36.5
7	199+000 LHS slowlane	12/2/2018	2	0.1296	0.0997	0.0626	0.0332	0.0321	0.0281	0.0136	26.2	36.5
7	199+000 LHS slowlane	12/2/2018	3	0.1286	0.0967	0.0656	0.0368	0.0356	0.0239	0.0168	26.2	36.5
7	199+250 LHS slowlane	12/2/2018	1	0.1433	0.1083	0.0577	0.0404	0.0232	0.0123	0.0266	26.2	36.5
7	199+250 LHS slowlane	12/2/2018	2	0.1422	0.1090	0.0597	0.0420	0.0221	0.0203	0.0310	26.2	36.5
7	199+250 LHS slowlane	12/2/2018	3	0.1466	0.1097	0.0614	0.0424	0.0234	0.0211	0.0140	26.2	36.5
7	199+500 LHS slowlane	12/2/2018	1	0.1450	0.1115	0.0680	0.0457	0.0305	0.0200	0.0143	26.2	39.5
7	199+500 LHS slowlane	12/2/2018	2	0.1412	0.1044	0.0662	0.0446	0.0299	0.0183	0.0024	26.2	39.5
7	199+500 LHS slowlane	12/2/2018	3	0.1424	0.1060	0.0663	0.0440	0.0273	0.0189	0.0193	26.2	39.5
7	199+750 LHS slowlane	12/2/2018	1	0.1885	0.1417	0.0765	0.0440	0.0345	0.0252	0.0160	26.4	39.5
7	199+750 LHS slowlane	12/2/2018	2	0.1804	0.1336	0.0772	0.0406	0.0357	0.0327	0.0183	26.4	39.5
7	199+750 LHS slowlane	12/2/2018	3	0.1758	0.1314	0.0754	0.0463	0.0329	0.0335	0.0197	26.4	39.5

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	200+000 LHS slowlane	12/2/2018	1	0.0963	0.0704	0.0438	0.0289	0.0183	0.0150	0.0060	26.5	39.5
7	200+000 LHS slowlane	12/2/2018	2	0.0989	0.0748	0.0447	0.0340	0.0196	0.0114	0.0057	26.5	39.5
7	200+000 LHS slowlane	12/2/2018	3	0.0979	0.0733	0.0459	0.0378	0.0183	0.0283	0.0141	26.5	39.5
7	200+250 LHS slowlane	12/2/2018	1	0.1809	0.1373	0.0833	0.0548	0.0308	0.0254	0.0195	26.5	39.5
7	200+250 LHS slowlane	12/2/2018	2	0.1779	0.1351	0.0875	0.0508	0.0330	0.0269	0.0225	26.6	39.5
7	200+250 LHS slowlane	12/2/2018	3	0.1738	0.1357	0.0863	0.0530	0.0342	0.0294	0.0234	26.5	39.5
7	200+500 LHS slowlane	12/2/2018	1	0.1416	0.0990	0.0551	0.0263	0.0252	0.0142	0.0142	26.4	39.5
7	200+500 LHS slowlane	12/2/2018	2	0.1389	0.0957	0.0539	0.0654	0.0286	0.0126	0.0136	26.4	39.5
7	200+500 LHS slowlane	12/2/2018	3	0.1390	0.0933	0.0521	0.0528	0.0258	0.0023	0.0155	26.4	39.5
7	200+750 LHS slowlane	12/2/2018	1	0.1512	0.1086	0.0627	0.0375	0.0157	0.0273	0.0159	26.5	39.5
7	200+750 LHS slowlane	12/2/2018	2	0.1525	0.1102	0.0634	0.0400	0.0180	0.0186	0.0177	26.5	39.5
7	200+750 LHS slowlane	12/2/2018	3	0.1479	0.1084	0.0603	0.0404	0.0187	0.0247	0.0158	26.6	39.5
7	201+000 LHS slowlane	12/2/2018	1	0.1751	0.1168	0.0681	0.0385	0.0283	0.0203	0.0020	26.7	39.5
7	201+000 LHS slowlane	12/2/2018	2	0.1791	0.1184	0.0703	0.0417	0.0285	0.0244	0.0138	26.7	39.5
7	201+000 LHS slowlane	12/2/2018	3	0.1631	0.1137	0.0684	0.0442	0.0291	0.0254	0.0156	26.7	39.5
7	201+250 LHS slowlane	12/2/2018	1	0.1436	0.1017	0.0668	0.0460	0.0321	0.0160	0.0139	26.8	39.5
7	201+250 LHS slowlane	12/2/2018	2	0.1391	0.1018	0.0633	0.0462	0.0309	0.0241	0.0184	26.8	39.5
7	201+250 LHS slowlane	12/2/2018	3	0.1381	0.1007	0.0628	0.0449	0.0301	0.0212	0.0163	26.8	39.5
7	201+500 LHS slowlane	12/2/2018	1	0.1479	0.1144	0.0738	0.0536	0.0363	0.0238	0.0194	26.7	39.5
7	201+500 LHS slowlane	12/2/2018	2	0.1474	0.1145	0.0742	0.0523	0.0355	0.0228	0.0201	26.8	39.5
7	201+500 LHS slowlane	12/2/2018	3	0.1443	0.1146	0.0747	0.0541	0.0375	0.0269	0.0179	26.7	39.5
7	201+750 LHS slowlane	12/2/2018	1	0.1245	0.0883	0.0558	0.0407	0.0221	0.0146	0.0169	26.7	39.5
7	201+750 LHS slowlane	12/2/2018	2	0.1230	0.0877	0.0553	0.0396	0.0226	0.0152	0.0137	26.7	39.5
7	201+750 LHS slowlane	12/2/2018	3	0.1234	0.0878	0.0530	0.0419	0.0244	0.0355	0.0150	26.7	39.5
7	202+000 LHS slowlane	12/2/2018	1	0.1156	0.0890	0.0514	0.0323	0.0289	0.0159	0.0169	26.6	39.5
7	202+000 LHS slowlane	12/2/2018	2	0.1103	0.0860	0.0565	0.0404	0.0272	0.0191	0.0268	26.6	39.5
7	202+000 LHS slowlane	12/2/2018	3	0.1145	0.0868	0.0545	0.0384	0.0297	0.0203	0.0264	26.6	39.5
7	202+250 LHS slowlane	12/2/2018	1	0.1543	0.1069	0.0616	0.0366	0.0238	0.0163	0.0162	26.6	39.5
7	202+250 LHS slowlane	12/2/2018	2	0.1520	0.1083	0.0617	0.0386	0.0243	0.0157	0.0180	26.6	39.5
7	202+250 LHS slowlane	12/2/2018	3	0.1479	0.1034	0.0602	0.0388	0.0233	0.0141	0.0249	26.6	39.5
7	202+500 LHS slowlane	12/2/2018	1	0.1391	0.0959	0.0557	0.0404	0.0171	0.0085	0.0042	26.4	39.5
7	202+500 LHS slowlane	12/2/2018	2	0.1426	0.0965	0.0554	0.0391	0.0183	0.0341	0.0176	26.4	39.5
7	202+500 LHS slowlane	12/2/2018	3	0.1437	0.0982	0.0561	0.0410	0.0159	0.0160	0.0095	26.4	39.5
7	202+750 LHS slowlane	12/2/2018	1	0.1455	0.1099	0.0651	0.0302	0.0318	0.0147	0.0241	26.3	39.5
7	202+750 LHS slowlane	12/2/2018	2	0.1427	0.1099	0.0692	0.0285	0.0352	0.0121	0.1189	26.3	39.5
7	202+750 LHS slowlane	12/2/2018	3	0.1440	0.1059	0.0694	0.0340	0.0331	0.0166	0.0157	26.3	39.5
7	203+000 LHS slowlane	12/2/2018	1	0.1098	0.0830	0.0493	0.0314	0.0264	0.0132	0.0164	26.5	39.5
7	203+000 LHS slowlane	12/2/2018	2	0.1076	0.0822	0.0505	0.0375	0.0236	0.0118	0.0121	26.5	39.5
7	203+000 LHS slowlane	12/2/2018	3	0.1046	0.0810	0.0520	0.0363	0.0263	0.0039	0.0158	26.4	39.5
7	203+250 LHS slowlane	12/2/2018	1	0.1333	0.0963	0.0593	0.0386	0.0264	0.0164	0.0127	26.8	39.5
7	203+250 LHS slowlane	12/2/2018	2	0.1303	0.0949	0.0575	0.0392	0.0295	0.0132	0.0066	26.8	39.5
7	203+250 LHS slowlane	12/2/2018	3	0.1305	0.0900	0.0576	0.0388	0.0284	0.0161	0.0138	26.8	39.5
7	204+000 LHS slowlane	12/2/2018	1	0.1453	0.1044	0.0609	0.0433	0.0343	0.0180	0.0185	26.7	39.5
7	204+000 LHS slowlane	12/2/2018	2	0.1426	0.1008	0.0633	0.0408	0.0299	0.0201	0.0199	26.8	39.5
7	204+000 LHS slowlane	12/2/2018	3	0.1426	0.1002	0.0605	0.0421	0.0273	0.0199	0.0187	26.8	39.5
7	204+250 LHS slowlane	12/2/2018	1	0.1395	0.0951	0.0515	0.0312	0.0197	0.0098	0.0049	27.0	39.5
7	204+250 LHS slowlane	12/2/2018	2	0.1386	0.0960	0.0533	0.0323	0.0201	0.0123	0.0046	26.9	39.5
7	204+250 LHS slowlane	12/2/2018	3	0.1366	0.0960	0.0535	0.0318	0.0198	0.0125	0.0017	26.9	39.5
7	204+500 LHS slowlane	12/2/2018	1	0.1553	0.1108	0.0617	0.0417	0.0304	0.0237	0.0156	26.9	39.5
7	204+500 LHS slowlane	12/2/2018	2	0.1544	0.1096	0.0629	0.0440	0.0322	0.0234	0.0163	26.9	39.5
7	204+500 LHS slowlane	12/2/2018	3	0.1469	0.1064	0.0603	0.0405	0.0298	0.0214	0.0178	26.9	39.5
7	204+750 LHS slowlane	12/2/2018	1	0.2210	0.1490	0.0783	0.0498	0.0350	0.0267	0.0192	26.9	39.5
7	204+750 LHS slowlane	12/2/2018	2	0.2224	0.1531	0.0822	0.0503	0.0384	0.0268	0.0220	26.9	39.5
7	204+750 LHS slowlane	12/2/2018	3	0.2168	0.1534	0.0831	0.0527	0.0358	0.0274	0.0218	26.9	39.5
7	205+000 LHS slowlane	12/2/2018	1	0.1352	0.0945	0.0566	0.0394	0.0263	0.0248	0.0208	27.0	39.5
7	205+000 LHS slowlane	12/2/2018	2	0.1355	0.0965	0.0612	0.0421	0.0299	0.0225	0.0179	27.0	39.5
7	205+000 LHS slowlane	12/2/2018	3	0.1363	0.0986	0.0625	0.0436	0.0322	0.0246	0.0202	27.0	39.5
7	205+250 LHS slowlane	12/2/2018	1	0.1494	0.1123	0.0727	0.0532	0.0387	0.0338	0.0244	27.0	39.5
7	205+250 LHS slowlane	12/2/2018	2	0.1474	0.1099	0.0718	0.0524	0.0387	0.0324	0.0241	27.0	39.5
7	205+250 LHS slowlane	12/2/2018	3	0.1460	0.1127	0.0748	0.0533	0.0393	0.0302	0.0256	27.0	39.5
7	205+500 LHS slowlane	12/2/2018	1	0.1958	0.1440	0.0836	0.0575	0.0412	0.0291	0.0228	27.0	39.5
7	205+500 LHS slowlane	12/2/2018	2	0.1962	0.1451	0.0826	0.0592	0.0435	0.0289	0.0228	27.0	39.5
7	205+500 LHS slowlane	12/2/2018	3	0.1929	0.1426	0.0823	0.0597	0.0431	0.0304	0.0231	27.0	39.5
7	205+750 LHS slowlane	12/2/2018	1	0.1628	0.1125	0.0587	0.0375	0.0259	0.0206	0.0138	27.0	39.5
7	205+750 LHS slowlane	12/2/2018	2	0.1600	0.1106	0.0612	0.0371	0.0261	0.0204	0.0158	27.0	39.5
7	205+750 LHS slowlane	12/2/2018	3	0.1569	0.1086	0.0583	0.0369	0.0255	0.0207	0.0171	27.0	39.5
7	206+000 LHS slowlane	12/2/2018	1	0.1758	0.1333	0.0777	0.0496	0.0351	0.0247	0.0188	27.0	39.5
7	206+000 LHS slowlane	12/2/2018	2	0.1780	0.1352	0.0783	0.0512	0.0361	0.0230	0.0187	26.9	39.5
7	206+000 LHS slowlane	12/2/2018	3	0.1790	0.1314	0.0795	0.0506	0.0394	0.0224	0.0181	26.9	39.5
7	206+250 LHS slowlane	12/2/2018	1	0.2031	0.1389	0.0776	0.0507	0.0353	0.0210	0.0157	27.0	39.5
7	206+250 LHS slowlane	12/2/2018	2	0.2008	0.1381	0.0777	0.0513	0.0359	0.0219	0.0153	27.0	39.5
7	206+250 LHS slowlane	12/2/2018	3	0.2023	0.1414	0.0797	0.0521	0.0339	0.0214	0.0167	27.0	39.5
7	206+500 LHS slowlane	12/2/2018	1	0.1518	0.1158	0.0687	0.0469	0.0371	0.0232	0.0192	27.2	39.5
7	206+500 LHS slowlane	12/2/2018	2	0.1479	0.1114	0.0679	0.0452	0.0324	0.0245	0.0194	27.1	39.5
7	206+500 LHS slowlane	12/2/2018	3	0.1489	0.1148	0.0684	0.0461	0.0352	0.0237	0.0174	27.1	39.5
7	206+750 LHS slowlane	12/2/2018	1	0.1374	0.0982	0.0664	0.0443	0.0311	0.0211	0.0195	27.0	41.5



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	206+750 LHS slowlane	12/2/2018	2	0.1331	0.0981	0.0641	0.0450	0.0308	0.0226	0.0162	27.0	41.5
7	206+750 LHS slowlane	12/2/2018	3	0.1330	0.0961	0.0650	0.0431	0.0311	0.0207	0.0166	27.0	41.5
7	207+000 LHS slowlane	12/2/2018	1	0.1129	0.0858	0.0584	0.0444	0.0331	0.0246	0.0190	26.9	41.5
7	207+000 LHS slowlane	12/2/2018	2	0.1144	0.0878	0.0585	0.0446	0.0326	0.0245	0.0192	27.0	41.5
7	207+000 LHS slowlane	12/2/2018	3	0.1121	0.0875	0.0590	0.0437	0.0334	0.0247	0.0184	27.0	41.5
7	207+250 LHS slowlane	12/2/2018	1	0.1332	0.1011	0.0652	0.0473	0.0385	0.0257	0.0192	27.1	41.5
7	207+250 LHS slowlane	12/2/2018	2	0.1349	0.1008	0.0659	0.0478	0.0385	0.0258	0.0208	27.1	41.5
7	207+250 LHS slowlane	12/2/2018	3	0.1314	0.0998	0.0649	0.0467	0.0346	0.0270	0.0219	27.2	41.5
7	207+500 LHS slowlane	12/2/2018	1	0.1936	0.1341	0.0786	0.0551	0.0379	0.0283	0.0230	27.2	41.5
7	207+500 LHS slowlane	12/2/2018	2	0.1937	0.1341	0.0815	0.0557	0.0403	0.0279	0.0239	27.2	41.5
7	207+500 LHS slowlane	12/2/2018	3	0.1921	0.1335	0.0807	0.0548	0.0385	0.0285	0.0242	27.2	41.5
7	207+750 LHS slowlane	12/2/2018	1	0.1830	0.1182	0.0683	0.0493	0.0376	0.0291	0.0246	27.1	41.5
7	207+750 LHS slowlane	12/2/2018	2	0.1770	0.1168	0.0687	0.0491	0.0383	0.0290	0.0263	27.1	41.5
7	207+750 LHS slowlane	12/2/2018	3	0.1761	0.1165	0.0672	0.0486	0.0385	0.0293	0.0247	27.1	41.5
7	208+000 LHS slowlane	12/2/2018	1	0.2522	0.1821	0.1058	0.0701	0.0471	0.0309	0.0233	27.0	41.5
7	208+000 LHS slowlane	12/2/2018	2	0.2574	0.1885	0.1100	0.0726	0.0495	0.0341	0.0237	27.0	41.5
7	208+000 LHS slowlane	12/2/2018	3	0.2551	0.1873	0.1114	0.0722	0.0481	0.0332	0.0234	27.0	41.5
7	208+250 LHS slowlane	12/2/2018	1	0.1660	0.1166	0.0709	0.0474	0.0353	0.0275	0.0217	27.0	41.5
7	208+250 LHS slowlane	12/2/2018	2	0.1637	0.1182	0.0711	0.0499	0.0352	0.0293	0.0203	27.0	41.5
7	208+250 LHS slowlane	12/2/2018	3	0.1662	0.1182	0.0694	0.0485	0.0357	0.0253	0.0219	27.1	41.5
7	208+500 LHS slowlane	12/2/2018	1	0.2590	0.1866	0.1012	0.0636	0.0448	0.0294	0.0236	27.0	41.5
7	208+500 LHS slowlane	12/2/2018	2	0.2544	0.1821	0.0989	0.0650	0.0427	0.0281	0.0249	27.0	41.5
7	208+500 LHS slowlane	12/2/2018	3	0.2545	0.1866	0.1027	0.0641	0.0430	0.0307	0.0235	27.0	41.5
7	208+750 LHS slowlane	12/2/2018	1	0.2023	0.1452	0.0845	0.0582	0.0425	0.0263	0.0221	27.1	41.5
7	208+750 LHS slowlane	12/2/2018	2	0.2025	0.1436	0.0870	0.0591	0.0455	0.0226	0.0212	27.1	41.5
7	208+750 LHS slowlane	12/2/2018	3	0.2064	0.1473	0.0882	0.0614	0.0419	0.0249	0.0227	27.1	41.5
7	209+000 LHS slowlane	12/2/2018	1	0.1550	0.1093	0.0667	0.0405	0.0213	0.0219	0.0170	27.0	41.5
7	209+000 LHS slowlane	12/2/2018	2	0.1517	0.1118	0.0667	0.0427	0.0253	0.0213	0.0218	27.0	41.5
7	209+000 LHS slowlane	12/2/2018	3	0.1494	0.1060	0.0692	0.0425	0.0222	0.0234	0.0160	27.0	41.5
7	209+250 LHS slowlane	12/2/2018	1	0.1512	0.1140	0.0751	0.0530	0.0380	0.0257	0.0209	27.1	41.5
7	209+250 LHS slowlane	12/2/2018	2	0.1493	0.1110	0.0751	0.0524	0.0380	0.0274	0.0209	27.1	41.5
7	209+250 LHS slowlane	12/2/2018	3	0.1505	0.1124	0.0755	0.0530	0.0393	0.0279	0.0216	27.1	41.5
7	209+500 LHS slowlane	12/2/2018	1	0.2117	0.1493	0.0915	0.0643	0.0479	0.0357	0.0282	27.2	41.5
7	209+500 LHS slowlane	12/2/2018	2	0.2073	0.1478	0.0908	0.0639	0.0483	0.0363	0.0296	27.2	41.5
7	209+500 LHS slowlane	12/2/2018	3	0.2038	0.1461	0.0903	0.0651	0.0484	0.0367	0.0291	27.2	41.5
7	209+750 LHS slowlane	12/2/2018	1	0.3098	0.2278	0.1203	0.0621	0.0387	0.0253	0.0256	27.2	41.5
7	209+750 LHS slowlane	12/2/2018	2	0.3043	0.2244	0.1189	0.0640	0.0418	0.0252	0.0273	27.2	41.5
7	209+750 LHS slowlane	12/2/2018	3	0.3012	0.2258	0.1242	0.0588	0.0328	0.0193	0.0247	27.2	41.5
7	210+000 LHS slowlane	12/2/2018	1	0.1463	0.1170	0.0798	0.0567	0.0413	0.0206	0.1101	27.3	41.5
7	210+000 LHS slowlane	12/2/2018	2	0.1484	0.1150	0.0780	0.0558	0.0425	0.0258	0.1184	27.3	41.5
7	210+000 LHS slowlane	12/2/2018	3	0.1487	0.1184	0.0816	0.0572	0.0393	0.0205	0.0220	27.3	41.5
7	210+250 LHS slowlane	12/2/2018	1	0.2043	0.1603	0.1014	0.0595	0.0200	0.0345	0.0273	27.4	41.5
7	210+250 LHS slowlane	12/2/2018	2	0.2000	0.1663	0.1047	0.0483	0.0564	0.0312	0.0301	27.4	41.5
7	210+250 LHS slowlane	12/2/2018	3	0.2017	0.1611	0.1059	0.0613	0.0560	0.0338	0.0327	27.4	41.5
7	210+500 LHS slowlane	12/2/2018	1	0.1415	0.0988	0.0797	0.0483	0.0357	0.0195	0.0187	27.4	41.5
7	210+500 LHS slowlane	12/2/2018	2	0.1422	0.1065	0.0798	0.0510	0.0416	0.0266	0.0230	27.4	41.5
7	210+500 LHS slowlane	12/2/2018	3	0.1380	0.1043	0.0790	0.0504	0.0388	0.0223	0.0194	27.4	41.5
7	210+700 LHS slowlane	12/2/2018	1	0.1770	0.1328	0.0803	0.0537	0.0387	0.0269	0.0232	27.3	41.5
7	210+700 LHS slowlane	12/2/2018	2	0.1799	0.1334	0.0828	0.0570	0.0409	0.0297	0.0258	27.2	41.5
7	210+700 LHS slowlane	12/2/2018	3	0.1787	0.1332	0.0788	0.0557	0.0374	0.0292	0.0232	27.2	41.5
7	211+000 LHS slowlane	12/2/2018	1	0.1931	0.1304	0.0730	0.0474	0.0321	0.0290	0.0295	27.2	41.5
7	211+000 LHS slowlane	12/2/2018	2	0.1900	0.1323	0.0713	0.0466	0.0333	0.0314	0.0265	27.2	41.5
7	211+000 LHS slowlane	12/2/2018	3	0.1888	0.1302	0.0739	0.0489	0.0354	0.0320	0.0273	27.2	41.5
7	210+850 RHS fastlane	12/2/2018	1	0.1507	0.1155	0.0746	0.0514	0.0366	0.0248	0.0201	27.2	41.5
7	210+850 RHS fastlane	12/2/2018	2	0.1508	0.1175	0.0774	0.0526	0.0382	0.0280	0.0234	27.2	41.5
7	210+850 RHS fastlane	12/2/2018	3	0.1510	0.1150	0.0769	0.0533	0.0365	0.0262	0.0242	27.2	41.5
7	210+350 RHS fastlane	12/2/2018	1	0.2270	0.1622	0.0890	0.0597	0.0378	0.0289	0.0251	27.2	41.5
7	210+350 RHS fastlane	12/2/2018	2	0.2290	0.1666	0.0954	0.0529	0.0496	0.0233	0.0282	27.2	41.5
7	210+350 RHS fastlane	12/2/2018	3	0.2233	0.1633	0.0929	0.0520	0.0482	0.0199	0.0256	27.2	41.5
7	209+850 RHS fastlane	12/2/2018	1	0.2033	0.1373	0.0768	0.0499	0.0338	0.0305	0.0311	27.4	41.5
7	209+850 RHS fastlane	12/2/2018	2	0.2000	0.1393	0.0750	0.0490	0.0350	0.0331	0.0279	27.4	41.5
7	209+850 RHS fastlane	12/2/2018	3	0.1987	0.1370	0.0778	0.0515	0.0373	0.0337	0.0287	27.4	41.5
7	209+350 RHS fastlane	12/2/2018	1	0.1586	0.1216	0.0785	0.0541	0.0385	0.0261	0.0212	27.6	41.5
7	209+350 RHS fastlane	12/2/2018	2	0.1587	0.1237	0.0815	0.0554	0.0402	0.0295	0.0246	27.6	41.5
7	209+350 RHS fastlane	12/2/2018	3	0.1589	0.1211	0.0809	0.0561	0.0384	0.0276	0.0255	27.6	41.5
7	208+850 RHS fastlane	12/2/2018	1	0.2483	0.1915	0.1087	0.0648	0.0400	0.0318	0.0264	27.5	41.5
7	208+850 RHS fastlane	12/2/2018	2	0.2092	0.1755	0.1072	0.0620	0.0420	0.0302	0.0333	27.5	41.5
7	208+850 RHS fastlane	12/2/2018	3	0.2403	0.1871	0.1087	0.0631	0.0408	0.0303	0.0307	27.5	41.5
7	208+350 RHS fastlane	12/2/2018	1	0.2429	0.1859	0.1102	0.0749	0.0516	0.0388	0.0292	27.5	41.5
7	208+350 RHS fastlane	12/2/2018	2	0.2388	0.1821	0.1119	0.0741	0.0507	0.0357	0.0342	27.5	41.5
7	208+350 RHS fastlane	12/2/2018	3	0.2402	0.1844	0.1124	0.0752	0.0540	0.0380	0.0315	27.5	41.5
7	207+850 RHS fastlane	12/2/2018	1	0.1830	0.1300	0.0780	0.0496	0.0356	0.0320	0.0397	27.4	41.5
7	207+850 RHS fastlane	12/2/2018	2	0.1821	0.1264	0.0797	0.0520	0.0348	0.0249	0.0236	27.4	41.5
7	207+850 RHS fastlane	12/2/2018	3	0.1817	0.1293	0.0800	0.0528	0.0366	0.0265	0.0284	27.5	41.5
7	207+350 RHS fastlane	12/2/2018	1	0.1624	0.1262	0.0804	0.0537	0.0338	0.0290	0.0272	27.4	41.5
7	207+350 RHS fastlane	12/2/2018	2	0.1641	0.1239	0.0807	0.0536	0.0359	0.0265	0.0199	27.4	41.5

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	207+350 RHS fastlane	12/2/2018	3	0.1608	0.1241	0.0807	0.0533	0.0346	0.0249	0.0220	27.4	41.5
7	206+850 RHS fastlane	12/2/2018	1	0.2051	0.1523	0.0946	0.0618	0.0465	0.0331	0.0225	27.4	41.5
7	206+850 RHS fastlane	12/2/2018	2	0.2000	0.1487	0.0953	0.0611	0.0464	0.0306	0.0229	27.4	41.5
7	206+850 RHS fastlane	12/2/2018	3	0.2017	0.1493	0.0955	0.0642	0.0442	0.0301	0.0280	27.4	41.5
7	206+350 RHS fastlane	12/2/2018	1	0.1290	0.0853	0.0464	0.0310	0.0175	0.0082	0.0076	27.4	41.5
7	206+350 RHS fastlane	12/2/2018	2	0.1251	0.0803	0.0454	0.0310	0.0160	0.0123	0.0195	27.4	41.5
7	206+350 RHS fastlane	12/2/2018	3	0.1241	0.0822	0.0462	0.0312	0.0170	0.0085	0.0042	27.4	41.5
7	205+850 RHS fastlane	12/2/2018	1	0.1519	0.1103	0.0667	0.0468	0.0342	0.0245	0.0187	27.4	41.5
7	205+850 RHS fastlane	12/2/2018	2	0.1513	0.1091	0.0647	0.0451	0.0357	0.0256	0.0227	27.4	41.5
7	205+850 RHS fastlane	12/2/2018	3	0.1519	0.1115	0.0699	0.0477	0.0349	0.0276	0.0251	27.4	41.5
7	205+350 RHS fastlane	12/2/2018	1	0.1683	0.1169	0.0705	0.0483	0.0351	0.0252	0.0219	27.6	41.5
7	205+350 RHS fastlane	12/2/2018	2	0.1662	0.1190	0.0723	0.0488	0.0360	0.0267	0.0219	27.7	41.5
7	205+350 RHS fastlane	12/2/2018	3	0.1665	0.1185	0.0714	0.0490	0.0346	0.0266	0.0213	27.6	41.5
7	204+850 RHS fastlane	12/2/2018	1	0.1968	0.1466	0.0882	0.0599	0.0411	0.0167	0.0210	27.7	41.5
7	204+850 RHS fastlane	12/2/2018	2	0.1923	0.1220	0.0855	0.0556	0.0350	0.0187	0.0219	27.6	41.5
7	204+850 RHS fastlane	12/2/2018	3	0.1936	0.1447	0.0866	0.0581	0.0338	0.0213	0.0220	27.6	41.5
7	204+350 RHS fastlane	12/2/2018	1	0.1592	0.1076	0.0538	0.0310	0.0306	0.0245	0.0264	27.4	41.5
7	204+350 RHS fastlane	12/2/2018	2	0.1580	0.1115	0.0616	0.0356	0.0247	0.0212	0.0106	27.5	41.5
7	204+350 RHS fastlane	12/2/2018	3	0.1586	0.1107	0.0592	0.0353	0.0273	0.0318	0.0159	27.4	41.5
7	203+850 RHS fastlane	12/2/2018	1	0.1855	0.1185	0.0663	0.0506	0.0239	0.0199	0.0158	27.2	41.5
7	203+850 RHS fastlane	12/2/2018	2	0.1881	0.1204	0.0696	0.0483	0.0272	0.0215	0.0192	27.2	41.5
7	203+850 RHS fastlane	12/2/2018	3	0.1865	0.1231	0.0693	0.0454	0.0285	0.0157	0.0154	27.2	41.5
7	202+850 RHS fastlane	12/2/2018	1	0.1934	0.1383	0.0827	0.0529	0.0344	0.0241	0.0208	27.2	41.5
7	202+850 RHS fastlane	12/2/2018	2	0.1850	0.1323	0.0817	0.0505	0.0344	0.0257	0.0199	27.2	41.5
7	202+850 RHS fastlane	12/2/2018	3	0.1876	0.1346	0.0817	0.0519	0.0356	0.0243	0.0223	27.2	41.5
7	202+350 RHS fastlane	12/2/2018	1	0.1664	0.1197	0.0703	0.0461	0.0323	0.0215	0.0133	27.2	41.5
7	202+350 RHS fastlane	12/2/2018	2	0.1659	0.1188	0.0705	0.0465	0.0335	0.0261	0.0185	27.2	41.5
7	202+350 RHS fastlane	12/2/2018	3	0.1641	0.1173	0.0719	0.0418	0.0351	0.0239	0.0125	27.2	41.5
7	201+850 RHS fastlane	12/2/2018	1	0.1623	0.1078	0.0624	0.0404	0.0277	0.0179	0.0160	27.2	43.6
7	201+850 RHS fastlane	12/2/2018	2	0.1638	0.1091	0.0615	0.0436	0.0230	0.0228	0.0298	27.2	43.6
7	201+850 RHS fastlane	12/2/2018	3	0.1623	0.1091	0.0615	0.0434	0.0296	0.0192	0.0153	27.2	43.6
7	201+350 RHS fastlane	12/2/2018	1	0.1744	0.1101	0.0726	0.0465	0.0351	0.0203	0.0212	27.9	44
7	201+350 RHS fastlane	12/2/2018	2	0.1722	0.1133	0.0663	0.0465	0.0338	0.0185	0.0251	27.9	44
7	201+350 RHS fastlane	12/2/2018	3	0.1686	0.1180	0.0630	0.0443	0.0311	0.0261	0.0199	27.9	44
7	200+850 RHS fastlane	12/2/2018	1	0.1446	0.1024	0.0633	0.0496	0.0315	0.0266	0.0133	28.0	44
7	200+850 RHS fastlane	12/2/2018	2	0.1424	0.1061	0.0667	0.0429	0.0365	0.0295	0.0147	28.0	44
7	200+850 RHS fastlane	12/2/2018	3	0.1437	0.1029	0.0681	0.0474	0.0346	0.0315	0.0157	28.0	44
7	200+350 RHS fastlane	12/2/2018	1	0.1613	0.1117	0.0656	0.0444	0.0295	0.0219	0.0109	27.9	44
7	200+350 RHS fastlane	12/2/2018	2	0.1598	0.1134	0.0626	0.0431	0.0287	0.0190	0.0095	27.9	44
7	200+350 RHS fastlane	12/2/2018	3	0.1572	0.1147	0.0646	0.0430	0.0272	0.0191	0.0204	27.9	44
7	199+850 RHS fastlane	12/2/2018	1	0.1656	0.1181	0.0605	0.0427	0.0298	0.0259	0.0216	28.0	44
7	199+850 RHS fastlane	12/2/2018	2	0.1588	0.1201	0.0609	0.0429	0.0290	0.0238	0.0223	28.0	44
7	199+850 RHS fastlane	12/2/2018	3	0.1603	0.1041	0.0659	0.0452	0.0267	0.0303	0.0243	28.0	44
7	199+350 RHS fastlane	12/2/2018	1	0.0767	0.0407	0.0304	0.0261	0.0174	0.0176	0.0088	27.8	44
7	199+350 RHS fastlane	12/2/2018	2	0.0773	0.0435	0.0291	0.0298	0.0182	0.0130	0.0123	27.8	44
7	199+350 RHS fastlane	12/2/2018	3	0.0770	0.0414	0.0342	0.0282	0.0189	0.0167	0.0083	27.8	44
7	198+850 RHS fastlane	12/2/2018	1	0.1747	0.1186	0.0722	0.0529	0.0328	0.0298	0.0169	27.9	44
7	198+850 RHS fastlane	12/2/2018	2	0.1713	0.1191	0.0752	0.0508	0.0362	0.0262	0.0179	27.9	44
7	198+850 RHS fastlane	12/2/2018	3	0.1739	0.1260	0.0724	0.0549	0.0332	0.0276	0.0170	27.9	44
7	198+350 RHS fastlane	12/2/2018	1	0.1450	0.0929	0.0601	0.0421	0.0391	0.0138	0.0215	27.9	44
7	198+350 RHS fastlane	12/2/2018	2	0.1475	0.0926	0.0605	0.0424	0.0276	0.0198	0.0193	28.0	44
7	198+350 RHS fastlane	12/2/2018	3	0.1463	0.0988	0.0614	0.0424	0.0241	0.0218	0.0192	28.0	44
7	197+850 RHS fastlane	12/2/2018	1	0.2082	0.1500	0.0739	0.0406	0.0295	0.0203	0.0386	28.0	44
7	197+850 RHS fastlane	12/2/2018	2	0.2059	0.1514	0.0722	0.0444	0.0280	0.0204	0.0334	28.0	44
7	197+850 RHS fastlane	12/2/2018	3	0.2022	0.1403	0.0748	0.0448	0.0300	0.0234	0.0294	28.0	44
7	197+350 RHS fastlane	12/2/2018	1	0.2146	0.1566	0.0908	0.0497	0.0518	0.0278	0.0269	28.0	44
7	197+350 RHS fastlane	12/2/2018	2	0.2140	0.1547	0.0928	0.0555	0.0518	0.0266	0.0199	28.0	44
7	197+350 RHS fastlane	12/2/2018	3	0.2133	0.1541	0.0876	0.0603	0.0497	0.0284	0.0182	28.0	44
7	196+850 RHS fastlane	12/2/2018	1	0.2054	0.1027	0.0513	0.0256	0.0128	0.0064	0.0032	28.0	44
7	196+850 RHS fastlane	12/2/2018	2	0.2008	0.1361	0.0824	0.0583	0.0382	0.0304	0.0259	28.0	44
7	196+850 RHS fastlane	12/2/2018	3	0.2008	0.1346	0.0840	0.0549	0.0382	0.0341	0.0255	28.0	44
7	196+350 RHS fastlane	12/2/2018	1	0.2495	0.1541	0.0741	0.0427	0.0247	0.0200	0.0155	28.1	44
7	196+350 RHS fastlane	12/2/2018	2	0.2472	0.1545	0.0736	0.0411	0.0276	0.0138	0.0160	28.1	44
7	196+350 RHS fastlane	12/2/2018	3	0.2388	0.1624	0.0734	0.0375	0.0198	0.0210	0.0132	28.1	44
7	195+850 RHS fastlane	12/2/2018	1	0.2405	0.1748	0.0912	0.0655	0.0425	0.0281	0.0140	28.1	44
7	195+850 RHS fastlane	12/2/2018	2	0.2406	0.1667	0.0918	0.0642	0.0395	0.0310	0.0305	28.1	44
7	195+850 RHS fastlane	12/2/2018	3	0.2378	0.1883	0.0916	0.0648	0.0423	0.0296	0.0178	28.1	44
7	195+350 RHS fastlane	12/2/2018	1	0.2465	0.1602	0.0867	0.0508	0.0340	0.0233	0.0263	28.2	44
7	195+350 RHS fastlane	12/2/2018	2	0.2412	0.1658	0.0882	0.0483	0.0401	0.0212	0.0264	28.2	44
7	195+350 RHS fastlane	12/2/2018	3	0.2431	0.1666	0.0894	0.0517	0.0403	0.0230	0.0288	28.2	44
7	194+850 RHS fastlane	12/2/2018	1	0.1640	0.1045	0.0604	0.0439	0.0227	0.0241	0.0153	28.1	44
7	194+850 RHS fastlane	12/2/2018	2	0.1618	0.1063	0.0628	0.0415	0.0295	0.0239	0.0174	28.1	44
7	194+850 RHS fastlane	12/2/2018	3	0.1637	0.1071	0.0624	0.0426	0.0289	0.0249	0.0186	28.1	44
7	194+350 RHS fastlane	12/2/2018	1	0.2141	0.1230	0.0664	0.0452	0.0358	0.0219	0.0201	28.0	44
7	194+350 RHS fastlane	12/2/2018	2	0.2159	0.1258	0.0692	0.0437	0.0321	0.0241	0.0195	28.0	44
7	194+350 RHS fastlane	12/2/2018	3	0.2108	0.1267	0.0662	0.0475	0.0349	0.0227	0.0187	28.0	44

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	193+850 RHS fastlane	12/2/2018	1	0.1768	0.1295	0.0819	0.0534	0.0377	0.0252	0.0217	28.1	44
7	193+850 RHS fastlane	12/2/2018	2	0.1725	0.1306	0.0847	0.0554	0.0389	0.0258	0.0227	28.1	44
7	193+850 RHS fastlane	12/2/2018	3	0.1713	0.1135	0.0816	0.0541	0.0351	0.0232	0.0264	28.1	44
7	193+350 RHS fastlane	12/2/2018	1	0.2419	0.1633	0.0868	0.0521	0.0489	0.0326	0.0280	28.3	44
7	193+350 RHS fastlane	12/2/2018	2	0.2420	0.1695	0.0849	0.0521	0.0490	0.0322	0.0287	28.3	44
7	193+350 RHS fastlane	12/2/2018	3	0.2369	0.1663	0.0826	0.0517	0.0498	0.0320	0.0278	28.3	44
7	192+850 RHS fastlane	12/2/2018	1	0.1603	0.1026	0.0726	0.0520	0.0390	0.0280	0.0140	28.3	44
7	192+850 RHS fastlane	12/2/2018	2	0.1601	0.1011	0.0748	0.0529	0.0373	0.0202	0.0080	28.3	44
7	192+850 RHS fastlane	12/2/2018	3	0.1559	0.1041	0.0725	0.0497	0.0360	0.0265	0.0140	28.3	44
7	192+350 RHS fastlane	12/2/2018	1	0.2095	0.1237	0.0766	0.0535	0.0380	0.0268	0.0141	28.3	44
7	192+350 RHS fastlane	12/2/2018	2	0.2027	0.0948	0.0735	0.0530	0.0398	0.0270	0.0182	28.3	44
7	192+350 RHS fastlane	12/2/2018	3	0.2056	0.1055	0.0799	0.0530	0.0412	0.0223	0.0009	28.3	44
7	191+850 RHS fastlane	12/2/2018	1	0.1590	0.0784	0.0568	0.0547	0.0263	0.0203	0.0188	28.4	44
7	191+850 RHS fastlane	12/2/2018	2	0.1602	0.0778	0.0577	0.0170	0.0256	0.0234	0.0131	28.4	44
7	191+850 RHS fastlane	12/2/2018	3	0.1586	0.0801	0.0566	0.1582	0.0239	0.0238	0.0133	28.4	44
7	191+350 RHS fastlane	12/2/2018	1	0.1935	0.1391	0.0697	0.0480	0.0404	0.0210	0.0145	28.4	44
7	191+350 RHS fastlane	12/2/2018	2	0.1959	0.1268	0.0676	0.0498	0.0330	0.0196	0.0141	28.4	44
7	191+350 RHS fastlane	12/2/2018	3	0.1916	0.1089	0.0707	0.0475	0.0338	0.0211	0.0160	28.4	44
7	190+850 RHS fastlane	12/2/2018	1	0.1358	0.0745	0.0611	0.0430	0.0212	0.0187	0.0164	28.3	44
7	190+850 RHS fastlane	12/2/2018	2	0.1402	0.1057	0.0599	0.0452	0.0284	0.0182	0.0164	28.3	44
7	190+850 RHS fastlane	12/2/2018	3	0.1406	0.0959	0.0591	0.0383	0.0294	0.0215	0.0179	28.3	44
7	190+350 RHS fastlane	12/2/2018	1	0.2048	0.1051	0.0749	0.0437	0.0338	0.0256	0.0208	28.4	44
7	190+350 RHS fastlane	12/2/2018	2	0.1999	0.1084	0.0722	0.0442	0.0332	0.0305	0.0216	28.4	44
7	190+350 RHS fastlane	12/2/2018	3	0.1956	0.1147	0.0691	0.0458	0.0341	0.0235	0.0215	28.4	44
7	189+850 RHS fastlane	12/2/2018	1	0.1547	0.1076	0.0627	0.0414	0.0268	0.0199	0.0164	28.5	44
7	189+850 RHS fastlane	12/2/2018	2	0.1535	0.0988	0.0641	0.0422	0.0270	0.0169	0.0186	28.4	44
7	189+850 RHS fastlane	12/2/2018	3	0.1493	0.1042	0.0614	0.0406	0.0277	0.0187	0.0150	28.4	44
7	189+350 RHS fastlane	12/2/2018	1	0.2047	0.1249	0.0793	0.0493	0.0341	0.0222	0.0233	28.4	44
7	189+350 RHS fastlane	12/2/2018	2	0.1973	0.1291	0.0771	0.0486	0.0360	0.0199	0.0236	28.5	44
7	189+350 RHS fastlane	12/2/2018	3	0.2004	0.1291	0.0777	0.0499	0.0361	0.0205	0.0247	28.4	44
7	188+850 RHS fastlane	12/2/2018	1	0.2554	0.1773	0.0931	0.0630	0.0594	0.0511	0.0363	28.5	44
7	188+850 RHS fastlane	12/2/2018	2	0.2611	0.1797	0.0981	0.0618	0.0537	0.0418	0.0343	28.5	44
7	188+850 RHS fastlane	12/2/2018	3	0.2537	0.1673	0.0940	0.0635	0.0563	0.0497	0.0384	28.5	44
7	188+350 RHS fastlane	12/2/2018	1	0.2099	0.1445	0.0839	0.0525	0.0373	0.0390	0.0335	28.6	43.5
7	188+350 RHS fastlane	12/2/2018	2	0.2098	0.1363	0.0899	0.0599	0.0434	0.0349	0.0307	28.6	43.5
7	188+350 RHS fastlane	12/2/2018	3	0.2042	0.1426	0.0876	0.0571	0.0392	0.0372	0.0334	28.6	43.5
7	187+850 RHS fastlane	12/2/2018	1	0.2586	0.1823	0.0957	0.0645	0.0322	0.0290	0.0183	28.5	43.5
7	187+850 RHS fastlane	12/2/2018	2	0.2623	0.1851	0.0938	0.0466	0.0246	0.0220	0.0340	28.5	43.5
7	187+850 RHS fastlane	12/2/2018	3	0.2570	0.1859	0.0953	0.0661	0.0678	0.0352	0.0240	28.5	43.5
7	187+350 RHS fastlane	12/2/2018	1	0.2470	0.1697	0.0975	0.0637	0.0482	0.0345	0.0311	28.5	43.5
7	187+350 RHS fastlane	12/2/2018	2	0.2466	0.1663	0.0970	0.0642	0.0456	0.0346	0.0298	28.5	43.5
7	187+350 RHS fastlane	12/2/2018	3	0.2457	0.1654	0.0960	0.0625	0.0476	0.0371	0.0297	28.5	43.5
7	186+850 RHS fastlane	12/2/2018	1	0.1622	0.1106	0.0644	0.0430	0.0259	0.0221	0.0179	28.5	43.5
7	186+850 RHS fastlane	12/2/2018	2	0.1648	0.1087	0.0614	0.0390	0.0278	0.0297	0.0146	28.5	43.5
7	186+850 RHS fastlane	12/2/2018	3	0.1650	0.1116	0.0641	0.0397	0.0325	0.0294	0.0189	28.4	43.5
7	186+350 RHS fastlane	12/2/2018	1	0.1828	0.1172	0.0612	0.0434	0.0276	0.0209	0.0156	28.3	43.5
7	186+350 RHS fastlane	12/2/2018	2	0.1894	0.1145	0.0654	0.0453	0.0338	0.0257	0.0217	28.3	43.5
7	186+350 RHS fastlane	12/2/2018	3	0.1905	0.1189	0.0696	0.0459	0.0357	0.0263	0.0224	28.3	43.5
7	185+850 RHS fastlane	12/2/2018	1	0.1887	0.1203	0.0602	0.0302	0.0173	0.0380	0.0138	28.3	43.5
7	185+850 RHS fastlane	12/2/2018	2	0.1946	0.1237	0.0624	0.0320	0.0224	0.0203	0.0164	28.3	43.5
7	185+850 RHS fastlane	12/2/2018	3	0.1919	0.1228	0.0624	0.0335	0.0219	0.0213	0.0141	28.3	43.5
7	185+350 RHS fastlane	12/2/2018	1	0.2362	0.1717	0.0915	0.0622	0.0529	0.1627	0.0194	28.3	43.5
7	185+350 RHS fastlane	12/2/2018	2	0.2323	0.1668	0.0869	0.0618	0.0557	0.0428	0.0161	28.3	43.5
7	185+350 RHS fastlane	12/2/2018	3	0.2337	0.1687	0.0955	0.0618	0.0454	0.0334	0.0270	28.3	43.5
7	184+850 RHS fastlane	12/2/2018	1	0.2063	0.1520	0.0863	0.0599	0.0418	0.0335	0.0234	28.4	43.5
7	184+850 RHS fastlane	12/2/2018	2	0.2039	0.1533	0.0890	0.0610	0.0368	0.0348	0.0244	28.3	43.5
7	184+850 RHS fastlane	12/2/2018	3	0.2017	0.1481	0.0906	0.0646	0.0379	0.0355	0.0271	28.3	43.5
7	184+350 RHS fastlane	12/2/2018	1	0.2306	0.1668	0.0925	0.0547	0.0477	0.0272	0.0259	28.4	43.5
7	184+350 RHS fastlane	12/2/2018	2	0.2252	0.1687	0.0983	0.0622	0.0508	0.0356	0.0270	28.4	43.5
7	184+350 RHS fastlane	12/2/2018	3	0.2255	0.1731	0.0968	0.0636	0.0473	0.0320	0.0299	28.4	43.5
7	183+850 RHS fastlane	12/2/2018	1	0.2232	0.1788	0.1022	0.0718	0.0489	0.0363	0.0364	28.4	43.5
7	183+850 RHS fastlane	12/2/2018	2	0.2211	0.1692	0.1028	0.0735	0.0518	0.0397	0.0369	28.4	43.5
7	183+850 RHS fastlane	12/2/2018	3	0.2195	0.1748	0.1014	0.0718	0.0528	0.0363	0.0337	28.4	43.5
7	183+350 RHS fastlane	12/2/2018	1	0.2592	0.1800	0.0954	0.0649	0.0558	0.0446	0.0309	28.3	43.5
7	183+350 RHS fastlane	12/2/2018	2	0.2560	0.1795	0.0999	0.0661	0.0573	0.0463	0.0344	28.3	43.5
7	183+350 RHS fastlane	12/2/2018	3	0.2595	0.1781	0.0922	0.0561	0.0519	0.0517	0.0388	28.3	43.5
7	182+850 RHS fastlane	12/2/2018	1	0.2297	0.1586	0.0858	0.0536	0.0433	0.0383	0.0237	28.3	43.5
7	182+850 RHS fastlane	12/2/2018	2	0.2327	0.1619	0.0899	0.0603	0.0502	0.0353	0.0247	28.3	43.5
7	182+850 RHS fastlane	12/2/2018	3	0.2302	0.1608	0.0906	0.0598	0.0508	0.0366	0.0199	28.3	43.5
7	182+350 RHS fastlane	12/2/2018	1	0.2322	0.1608	0.0905	0.0616	0.0382	0.0275	0.0207	28.3	43.5
7	182+350 RHS fastlane	12/2/2018	2	0.2306	0.1578	0.0952	0.0637	0.0416	0.0299	0.0228	28.3	43.5
7	182+350 RHS fastlane	12/2/2018	3	0.2264	0.1548	0.0925	0.0630	0.0413	0.0279	0.0225	28.3	43.5
7	181+850 RHS fastlane	12/2/2018	1	0.2743	0.1889	0.1049	0.0683	0.0545	0.0418	0.0328	28.3	43.5
7	181+850 RHS fastlane	12/2/2018	2	0.2715	0.1879	0.1053	0.0678	0.0530	0.0430	0.0324	28.3	43.5
7	181+850 RHS fastlane	12/2/2018	3	0.2712	0.1909	0.1054	0.0697	0.0544	0.0405	0.0335	28.3	43.5
7	181+350 RHS fastlane	12/2/2018	1	0.1459	0.1018	0.0617	0.0440	0.0301	0.0238	0.0211	28.3	43.5



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	181+350 RHS fastlane	12/2/2018	2	0.1479	0.1020	0.0616	0.0357	0.0372	0.0252	0.0317	28.3	43.5
7	181+350 RHS fastlane	12/2/2018	3	0.1483	0.1005	0.0635	0.0436	0.0350	0.0261	0.0224	28.3	43.5
7	180+850 RHS fastlane	12/2/2018	1	0.2455	0.1623	0.0938	0.0631	0.0549	0.0390	0.0285	28.2	43.5
7	180+850 RHS fastlane	12/2/2018	2	0.2429	0.1608	0.0941	0.0653	0.0483	0.0408	0.0292	28.2	43.5
7	180+850 RHS fastlane	12/2/2018	3	0.2408	0.1625	0.0941	0.0665	0.0453	0.0436	0.0354	28.2	43.5
7	180+350 RHS fastlane	12/2/2018	1	0.2550	0.1746	0.1062	0.0712	0.0517	0.0433	0.0329	28.1	43.5
7	180+350 RHS fastlane	12/2/2018	2	0.2528	0.1810	0.1086	0.0750	0.0565	0.0427	0.0328	28.1	43.5
7	180+350 RHS fastlane	12/2/2018	3	0.2468	0.1764	0.1072	0.0742	0.0524	0.0390	0.0357	28.1	43.5
7	179+850 RHS fastlane	12/2/2018	1	0.2123	0.1512	0.0933	0.0650	0.0469	0.0308	0.0236	28.1	43.5
7	179+850 RHS fastlane	12/2/2018	2	0.2130	0.1505	0.0926	0.0662	0.0464	0.0305	0.0236	28.1	43.5
7	179+850 RHS fastlane	12/2/2018	3	0.2111	0.1537	0.0940	0.0649	0.0471	0.0310	0.0237	28.1	43.5
7	179+350 RHS fastlane	12/2/2018	1	0.2399	0.1629	0.0922	0.0596	0.0424	0.0283	0.0225	28.2	43.5
7	179+350 RHS fastlane	12/2/2018	2	0.2347	0.1612	0.0948	0.0589	0.0442	0.0290	0.0181	28.2	43.5
7	179+350 RHS fastlane	12/2/2018	3	0.2352	0.1649	0.0934	0.0610	0.0440	0.0284	0.0212	28.2	43.5
7	178+850 RHS fastlane	12/2/2018	1	0.2285	0.1611	0.0980	0.0624	0.0559	0.0264	0.0198	28.2	43.5
7	178+850 RHS fastlane	12/2/2018	2	0.2308	0.1616	0.0962	0.0622	0.0499	0.0294	0.0238	28.2	43.5
7	178+850 RHS fastlane	12/2/2018	3	0.2254	0.1591	0.0937	0.0590	0.0431	0.0317	0.0302	28.2	43.5
7	178+350 RHS fastlane	12/2/2018	1	0.1179	0.0972	0.0700	0.0498	0.0364	0.0274	0.0137	28.2	43.5
7	178+350 RHS fastlane	12/2/2018	2	0.1138	0.0965	0.0631	0.0492	0.0401	0.0227	0.0113	28.2	43.5
7	178+350 RHS fastlane	12/2/2018	3	0.1170	0.0989	0.0692	0.0512	0.0399	0.0271	0.0135	28.2	43.5
7	177+850 RHS fastlane	12/2/2018	1	0.1503	0.0988	0.0582	0.0392	0.0298	0.0207	0.0191	28.1	43.5
7	177+850 RHS fastlane	12/2/2018	2	0.1528	0.0978	0.0567	0.0361	0.0319	0.0212	0.0236	28.1	43.5
7	177+850 RHS fastlane	12/2/2018	3	0.1495	0.0956	0.0499	0.0393	0.0284	0.0247	0.0204	28.1	43.5
7	177+350 RHS fastlane	12/2/2018	1	0.2357	0.1646	0.1041	0.0637	0.0512	0.0298	0.0213	28.0	43.5
7	177+350 RHS fastlane	12/2/2018	2	0.2333	0.1660	0.1021	0.0663	0.0548	0.0313	0.0206	28.0	43.5
7	177+350 RHS fastlane	12/2/2018	3	0.2303	0.1655	0.1032	0.0653	0.0512	0.0305	0.0213	28.0	43.5
7	176+850 RHS fastlane	12/2/2018	1	0.1981	0.1402	0.0700	0.0538	0.0346	0.0222	0.0111	28.0	43.5
7	176+850 RHS fastlane	12/2/2018	2	0.1934	0.1356	0.0743	0.0507	0.0378	0.0239	0.0231	28.0	43.5
7	176+850 RHS fastlane	12/2/2018	3	0.1964	0.1348	0.0762	0.0530	0.0374	0.0263	0.0210	28.0	43.5
7	176+350 RHS fastlane	12/2/2018	1	0.2427	0.1820	0.1087	0.0673	0.0534	0.0377	0.0412	27.9	43.5
7	176+350 RHS fastlane	12/2/2018	2	0.2354	0.1813	0.1095	0.0642	0.0497	0.0399	0.0199	27.9	43.5
7	176+350 RHS fastlane	12/2/2018	3	0.2373	0.1771	0.1081	0.0688	0.0471	0.0373	0.0158	27.9	43.5
7	175+850 RHS fastlane	12/2/2018	1	0.1279	0.0892	0.0477	0.0377	0.0279	0.0189	0.0185	27.8	43.5
7	175+850 RHS fastlane	12/2/2018	2	0.1323	0.0918	0.0555	0.0382	0.0320	0.0226	0.0166	27.8	43.5
7	175+850 RHS fastlane	12/2/2018	3	0.1318	0.0901	0.0543	0.0401	0.0329	0.0221	0.0173	27.7	43.5
7	175+350 RHS fastlane	12/2/2018	1	0.1640	0.1072	0.0619	0.0404	0.0372	0.0254	0.0197	27.6	43.5
7	175+350 RHS fastlane	12/2/2018	2	0.1641	0.1067	0.0634	0.0367	0.0322	0.0230	0.0186	27.7	43.5
7	175+350 RHS fastlane	12/2/2018	3	0.1638	0.1052	0.0661	0.0384	0.0354	0.0271	0.0210	27.7	43.5
7	174+850 RHS fastlane	12/2/2018	1	0.2135	0.1415	0.0787	0.0529	0.0343	0.0275	0.0267	27.6	43.5
7	174+850 RHS fastlane	12/2/2018	2	0.2163	0.1400	0.0816	0.0542	0.0378	0.0259	0.0229	27.7	43.5
7	174+850 RHS fastlane	12/2/2018	3	0.2122	0.1412	0.0815	0.0536	0.0358	0.0267	0.0226	27.7	43.5
7	174+350 RHS fastlane	12/2/2018	1	0.1672	0.1116	0.0573	0.0351	0.0230	0.0184	0.0135	27.5	42.4
7	174+350 RHS fastlane	12/2/2018	2	0.1671	0.1098	0.0598	0.0363	0.0242	0.0201	0.0144	27.6	42.4
7	174+350 RHS fastlane	12/2/2018	3	0.1630	0.1083	0.0587	0.0369	0.0222	0.0177	0.0146	27.6	42.4
7	173+850 RHS fastlane	12/2/2018	1	0.1442	0.0897	0.0555	0.0383	0.0261	0.0193	0.0165	27.2	42.4
7	173+850 RHS fastlane	12/2/2018	2	0.1426	0.0881	0.0588	0.0383	0.0229	0.0234	0.0202	27.3	42.4
7	173+850 RHS fastlane	12/2/2018	3	0.1415	0.0863	0.0513	0.0302	0.0290	0.0145	0.0166	27.3	42.4
7	173+350 RHS fastlane	12/2/2018	1	0.1672	0.1184	0.0739	0.0437	0.0312	0.0168	0.0084	27.2	42.4
7	173+350 RHS fastlane	12/2/2018	2	0.1703	0.1201	0.0734	0.0472	0.0363	0.0191	0.0095	27.2	42.4
7	173+350 RHS fastlane	12/2/2018	3	0.1695	0.1215	0.0770	0.0451	0.0380	0.0185	0.0092	27.2	42.4
7	172+850 RHS fastlane	12/2/2018	1	0.0880	0.0585	0.0355	0.0254	0.0201	0.0142	0.0071	27.2	42.4
7	172+850 RHS fastlane	12/2/2018	2	0.0912	0.0601	0.0370	0.0277	0.0227	0.0159	0.0079	27.2	42.4
7	172+850 RHS fastlane	12/2/2018	3	0.0871	0.0606	0.0360	0.0271	0.0216	0.0155	0.0077	27.2	42.4
7	172+350 RHS fastlane	12/2/2018	1	0.1869	0.1249	0.0718	0.0398	0.0308	0.0144	0.0072	27.3	42.4
7	172+350 RHS fastlane	12/2/2018	2	0.1875	0.1232	0.0727	0.0405	0.0322	0.0197	0.0098	27.3	42.4
7	172+350 RHS fastlane	12/2/2018	3	0.1882	0.1250	0.0726	0.0421	0.0317	0.0190	0.0008	27.3	42.4
7	171+850 RHS fastlane	12/2/2018	1	0.1807	0.1325	0.0789	0.0554	0.0422	0.0358	0.0160	27.3	42.4
7	171+850 RHS fastlane	12/2/2018	2	0.1828	0.1295	0.0834	0.0559	0.0429	0.0278	0.0214	27.3	42.4
7	171+850 RHS fastlane	12/2/2018	3	0.1790	0.1289	0.0856	0.0562	0.0430	0.0330	0.0175	27.3	42.4
7	171+350 RHS fastlane	12/2/2018	1	0.1972	0.1272	0.0694	0.0434	0.0277	0.0216	0.0216	27.2	42.4
7	171+350 RHS fastlane	12/2/2018	2	0.1937	0.1249	0.0702	0.0441	0.0357	0.0232	0.0188	27.2	42.4
7	171+350 RHS fastlane	12/2/2018	3	0.1928	0.1243	0.0721	0.0451	0.0327	0.0263	0.0212	27.2	42.4
7	170+850 RHS fastlane	12/2/2018	1	0.1397	0.0883	0.0506	0.0449	0.0315	0.0217	0.0180	27.2	42.4
7	170+850 RHS fastlane	12/2/2018	2	0.1388	0.0966	0.0572	0.0435	0.0322	0.0234	0.0179	27.2	42.4
7	170+850 RHS fastlane	12/2/2018	3	0.1381	0.0942	0.0573	0.0434	0.0315	0.0199	0.0186	27.2	42.4
7	170+350 RHS fastlane	12/2/2018	1	0.1283	0.0934	0.0578	0.0423	0.0357	0.0274	0.0197	27.2	42.4
7	170+350 RHS fastlane	12/2/2018	2	0.1281	0.0935	0.0585	0.0446	0.0342	0.0276	0.0205	27.2	42.4
7	170+350 RHS fastlane	12/2/2018	3	0.1289	0.0922	0.0587	0.0424	0.0398	0.0299	0.0206	27.2	42.4
7	169+850 RHS fastlane	12/2/2018	1	0.1414	0.1078	0.0718	0.0539	0.0435	0.0341	0.0288	27.2	42.4
7	169+850 RHS fastlane	12/2/2018	2	0.1443	0.1072	0.0754	0.0516	0.0415	0.0360	0.0312	27.2	42.4
7	169+850 RHS fastlane	12/2/2018	3	0.1416	0.1070	0.0744	0.0503	0.0493	0.0345	0.0343	27.2	42.4
7	169+350 RHS fastlane	12/2/2018	1	0.1359	0.0855	0.0528	0.0320	0.0246	0.0190	0.0064	27.2	42.4
7	169+350 RHS fastlane	12/2/2018	2	0.1371	0.0893	0.0522	0.0363	0.0269	0.0188	0.0151	27.2	42.4
7	169+350 RHS fastlane	12/2/2018	3	0.1337	0.0869	0.0552	0.0353	0.0235	0.0168	0.0154	27.2	42.4
7	168+850 RHS fastlane	12/2/2018	1	0.1389	0.0968	0.0569	0.0414	0.0296	0.0235	0.0167	27.2	42.4
7	168+850 RHS fastlane	12/2/2018	2	0.1397	0.1010	0.0563	0.0399	0.0287	0.0202	0.0187	27.2	42.4

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	168+850 RHS fastlane	12/2/2018	3	0.1381	0.0971	0.0551	0.0374	0.0309	0.0203	0.0183	27.2	42.4
7	168+350 RHS fastlane	12/2/2018	1	0.2248	0.1486	0.0836	0.0603	0.0483	0.0221	0.0284	27.1	42.4
7	168+350 RHS fastlane	12/2/2018	2	0.2204	0.1459	0.0807	0.0586	0.0492	0.0304	0.0303	27.1	42.4
7	168+350 RHS fastlane	12/2/2018	3	0.2197	0.1480	0.0822	0.0560	0.0465	0.0283	0.0293	27.1	42.4
7	167+850 RHS fastlane	12/2/2018	1	0.1327	0.0961	0.0569	0.0448	0.0335	0.0261	0.0202	27.1	42.4
7	167+850 RHS fastlane	12/2/2018	2	0.1324	0.0954	0.0594	0.0387	0.0325	0.0197	0.0151	27.1	42.4
7	167+850 RHS fastlane	12/2/2018	3	0.1312	0.0947	0.0601	0.0407	0.0333	0.0230	0.0151	27.1	42.4
7	167+350 RHS fastlane	12/2/2018	1	0.1171	0.0838	0.0507	0.0373	0.0276	0.0210	0.0156	27.2	42.4
7	167+350 RHS fastlane	12/2/2018	2	0.1180	0.0847	0.0466	0.0370	0.0269	0.0228	0.0140	27.1	42.4
7	167+350 RHS fastlane	12/2/2018	3	0.1165	0.0866	0.0488	0.0368	0.0281	0.0168	0.0175	27.1	42.4
7	166+850 RHS fastlane	12/2/2018	1	0.1771	0.1253	0.0648	0.0450	0.0269	0.0279	0.0139	27.0	42.4
7	166+850 RHS fastlane	12/2/2018	2	0.1784	0.1216	0.0694	0.0470	0.0403	0.0317	0.0204	27.0	42.4
7	166+850 RHS fastlane	12/2/2018	3	0.1734	0.1183	0.0686	0.0467	0.0345	0.0282	0.0095	27.0	42.4
7	166+350 RHS fastlane	12/2/2018	1	0.1501	0.1039	0.0621	0.0447	0.0363	0.0244	0.0183	27.0	42.4
7	166+350 RHS fastlane	12/2/2018	2	0.1484	0.1029	0.0646	0.0453	0.0335	0.0232	0.0189	27.0	42.4
7	166+350 RHS fastlane	12/2/2018	3	0.1502	0.1041	0.0637	0.0450	0.0355	0.0226	0.0202	27.0	42.4
7	165+850 RHS fastlane	12/2/2018	1	0.1925	0.1375	0.0814	0.0529	0.0351	0.0238	0.0214	27.1	42.4
7	165+850 RHS fastlane	12/2/2018	2	0.1918	0.1350	0.0837	0.0535	0.0371	0.0238	0.0364	27.1	42.4
7	165+850 RHS fastlane	12/2/2018	3	0.1911	0.1353	0.0830	0.0532	0.0372	0.0251	0.0241	27.1	42.4
7	165+350 RHS fastlane	12/2/2018	1	0.1808	0.1257	0.0727	0.0517	0.0385	0.0165	0.0176	27.1	42.4
7	165+350 RHS fastlane	12/2/2018	2	0.1816	0.1237	0.0736	0.0520	0.0355	0.0223	0.0194	27.2	42.4
7	165+350 RHS fastlane	12/2/2018	3	0.1819	0.1277	0.0760	0.0509	0.0361	0.0288	0.0223	27.2	42.4
7	164+850 RHS fastlane	12/2/2018	1	0.1868	0.1328	0.0751	0.0516	0.0344	0.0224	0.0192	27.1	42.4
7	164+850 RHS fastlane	12/2/2018	2	0.1883	0.1338	0.0783	0.0485	0.0361	0.0262	0.0191	27.1	42.4
7	164+850 RHS fastlane	12/2/2018	3	0.1852	0.1326	0.0770	0.0518	0.0380	0.0187	0.0238	27.1	42.4
7	164+350 RHS fastlane	12/2/2018	1	0.1647	0.1200	0.0713	0.0439	0.0315	0.0202	0.0159	27.0	42.4
7	164+350 RHS fastlane	12/2/2018	2	0.1632	0.1179	0.0699	0.0439	0.0327	0.0215	0.0180	27.0	42.4
7	164+350 RHS fastlane	12/2/2018	3	0.1630	0.1222	0.0743	0.0427	0.0281	0.0205	0.0181	27.0	42.4
7	163+850 RHS fastlane	12/2/2018	1	0.1513	0.1137	0.0732	0.0479	0.0348	0.0265	0.0178	27.0	42.4
7	163+850 RHS fastlane	12/2/2018	2	0.1555	0.1147	0.0717	0.0542	0.0393	0.0274	0.0223	27.0	42.4
7	163+850 RHS fastlane	12/2/2018	3	0.1556	0.1151	0.0737	0.0559	0.0388	0.0265	0.0234	27.0	42.4
7	163+350 RHS fastlane	12/2/2018	1	0.1596	0.1054	0.0646	0.0454	0.0326	0.0222	0.0154	27.0	40
7	163+350 RHS fastlane	12/2/2018	2	0.1609	0.1115	0.0685	0.0471	0.0318	0.0221	0.0174	27.0	40
7	163+350 RHS fastlane	12/2/2018	3	0.1576	0.1090	0.0662	0.0463	0.0312	0.0223	0.0172	27.0	40
7	162+850 RHS fastlane	13/2/2018	1	0.1901	0.1415	0.0869	0.0610	0.0461	0.0359	0.0285	24.3	29.4
7	162+850 RHS fastlane	13/2/2018	2	0.1887	0.1399	0.0870	0.0605	0.0462	0.0368	0.0281	24.3	29.4
7	162+850 RHS fastlane	13/2/2018	3	0.1867	0.1406	0.0875	0.0629	0.0483	0.0358	0.0295	24.3	29.4
7	162+350 RHS fastlane	13/2/2018	1	0.1885	0.1462	0.0957	0.0657	0.0534	0.0412	0.0290	24.3	29.4
7	162+350 RHS fastlane	13/2/2018	2	0.1890	0.1489	0.1015	0.0663	0.0581	0.0385	0.0324	24.4	29.4
7	162+350 RHS fastlane	13/2/2018	3	0.1900	0.1483	0.1019	0.0699	0.0594	0.0409	0.0360	24.4	29.4
7	161+850 RHS fastlane	13/2/2018	1	0.1615	0.1269	0.0820	0.0550	0.0465	0.0377	0.0295	24.4	29.4
7	161+850 RHS fastlane	13/2/2018	2	0.1615	0.1269	0.0826	0.0599	0.0505	0.0388	0.0301	24.4	29.4
7	161+850 RHS fastlane	13/2/2018	3	0.1561	0.1240	0.0802	0.0597	0.0464	0.0371	0.0299	24.4	29.4
7	161+350 RHS fastlane	13/2/2018	1	0.1600	0.1282	0.0871	0.0659	0.0468	0.0351	0.0289	24.5	29.4
7	161+350 RHS fastlane	13/2/2018	2	0.1578	0.1283	0.0859	0.0604	0.0513	0.0273	0.0325	24.4	29.4
7	161+350 RHS fastlane	13/2/2018	3	0.1565	0.1263	0.0855	0.0653	0.0511	0.0356	0.0278	24.5	29.4
7	159+350 RHS fastlane	13/2/2018	1	0.1064	0.0532	0.0473	0.0339	0.0281	0.0173	0.0159	24.6	29.4
7	159+350 RHS fastlane	13/2/2018	2	0.1027	0.0744	0.0482	0.0360	0.0281	0.0196	0.0173	24.6	29.4
7	159+350 RHS fastlane	13/2/2018	3	0.1015	0.0759	0.0478	0.0366	0.0291	0.0205	0.0159	24.6	29.4
7	158+850 RHS fastlane	13/2/2018	1	0.0266	0.0133	0.0066	0.0256	0.0212	0.0216	0.0164	24.7	29.4
7	158+850 RHS fastlane	13/2/2018	2	0.1066	0.0805	0.0538	0.0261	0.0189	0.0148	0.0164	24.7	29.4
7	158+850 RHS fastlane	13/2/2018	3	0.1058	0.0803	0.0513	0.0256	0.0186	0.0142	0.0124	24.7	29.4
7	158+350 RHS fastlane	13/2/2018	1	0.1450	0.1119	0.0703	0.0439	0.0290	0.0217	0.0166	24.8	29.4
7	158+350 RHS fastlane	13/2/2018	2	0.1437	0.1141	0.0703	0.0414	0.0290	0.0213	0.0146	24.8	29.4
7	158+350 RHS fastlane	13/2/2018	3	0.1418	0.1119	0.0706	0.0408	0.0283	0.0211	0.0156	24.8	29.4
7	157+850 RHS fastlane	13/2/2018	1	0.1197	0.0918	0.0567	0.0414	0.0269	0.0180	0.0172	24.8	29.4
7	157+850 RHS fastlane	13/2/2018	2	0.1200	0.0896	0.0564	0.0428	0.0287	0.0207	0.0136	24.8	29.4
7	157+850 RHS fastlane	13/2/2018	3	0.1177	0.0865	0.0559	0.0394	0.0288	0.0210	0.0140	24.8	29.4
7	157+350 RHS fastlane	13/2/2018	1	0.1129	0.0843	0.0559	0.0390	0.0306	0.0166	0.0176	24.9	29.4
7	157+350 RHS fastlane	13/2/2018	2	0.1123	0.0864	0.0550	0.0428	0.0264	0.0237	0.0139	24.9	29.4
7	157+350 RHS fastlane	13/2/2018	3	0.1113	0.0851	0.0549	0.0429	0.0274	0.0217	0.0142	24.8	29.4
7	156+850 RHS fastlane	13/2/2018	1	0.1201	0.0879	0.0572	0.0362	0.0263	0.0166	0.0173	24.8	29.4
7	156+850 RHS fastlane	13/2/2018	2	0.1190	0.0882	0.0565	0.0353	0.0283	0.0194	0.0156	24.8	29.4
7	156+850 RHS fastlane	13/2/2018	3	0.1188	0.0881	0.0560	0.0382	0.0279	0.0195	0.0166	24.8	29.4
7	156+350 RHS fastlane	13/2/2018	1	0.1520	0.1128	0.0778	0.0563	0.0364	0.0296	0.0188	24.8	29.4
7	156+350 RHS fastlane	13/2/2018	2	0.1506	0.1141	0.0799	0.0547	0.0356	0.0297	0.0180	24.8	29.4
7	156+350 RHS fastlane	13/2/2018	3	0.1539	0.1196	0.0756	0.0531	0.0411	0.0261	0.0171	24.8	29.4
7	155+850 RHS fastlane	13/2/2018	1	0.1218	0.0860	0.0504	0.0304	0.0244	0.0175	0.0220	24.8	29.4
7	155+850 RHS fastlane	13/2/2018	2	0.1204	0.0837	0.0556	0.0362	0.0278	0.0201	0.0074	24.8	29.4
7	155+850 RHS fastlane	13/2/2018	3	0.1194	0.0858	0.0550	0.0322	0.0240	0.0205	0.0140	24.8	29.4
7	155+350 RHS fastlane	13/2/2018	1	0.1254	0.0948	0.0600	0.0455	0.0325	0.0178	0.0190	24.7	29.4
7	155+350 RHS fastlane	13/2/2018	2	0.1234	0.0975	0.0633	0.0477	0.0314	0.0161	0.0191	24.7	29.4
7	155+350 RHS fastlane	13/2/2018	3	0.1242	0.0961	0.0623	0.0464	0.0366	0.0239	0.0185	24.7	29.4
7	154+850 RHS fastlane	13/2/2018	1	0.1714	0.1336	0.0763	0.0507	0.0396	0.0274	0.0129	24.7	29.4
7	154+850 RHS fastlane	13/2/2018	2	0.1667	0.1328	0.0775	0.0495	0.0384	0.0270	0.0183	24.8	29.4
7	154+850 RHS fastlane	13/2/2018	3	0.1690	0.1258	0.0769	0.0535	0.0388	0.0284	0.0235	24.8	29.4

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	154+350 RHS fastlane	13/2/2018	1	0.1493	0.1067	0.0676	0.0448	0.0308	0.0198	0.0162	24.8	29.4
7	154+350 RHS fastlane	13/2/2018	2	0.1456	0.1034	0.0707	0.0466	0.0280	0.0182	0.0162	24.8	29.4
7	154+350 RHS fastlane	13/2/2018	3	0.1459	0.1028	0.0677	0.0430	0.0286	0.0212	0.0130	24.8	29.4
7	153+850 RHS fastlane	13/2/2018	1	0.1297	0.0989	0.0581	0.0415	0.0296	0.0211	0.0147	24.9	29.4
7	153+850 RHS fastlane	13/2/2018	2	0.1290	0.0934	0.0602	0.0433	0.0295	0.0190	0.0095	24.8	29.4
7	153+850 RHS fastlane	13/2/2018	3	0.1300	0.0943	0.0636	0.0427	0.0302	0.0207	0.0164	24.8	29.4
7	153+350 RHS fastlane	13/2/2018	1	0.1316	0.0887	0.0425	0.0445	0.0310	0.0141	0.0134	24.7	29.4
7	153+350 RHS fastlane	13/2/2018	2	0.1301	0.0892	0.0546	0.0456	0.0332	0.0149	0.0138	24.7	29.4
7	153+350 RHS fastlane	13/2/2018	3	0.1304	0.0910	0.0581	0.0442	0.0348	0.0158	0.0158	24.7	29.4
7	152+850 RHS fastlane	13/2/2018	1	0.1360	0.0990	0.0649	0.0434	0.0279	0.0172	0.0174	24.8	29.4
7	152+850 RHS fastlane	13/2/2018	2	0.1402	0.1023	0.0662	0.0470	0.0280	0.0206	0.0144	24.8	29.4
7	152+850 RHS fastlane	13/2/2018	3	0.1373	0.1001	0.0647	0.0443	0.0277	0.0205	0.0163	24.8	29.4
7	152+350 RHS fastlane	13/2/2018	1	0.1679	0.1153	0.0787	0.0449	0.0304	0.0195	0.0131	24.8	32.5
7	152+350 RHS fastlane	13/2/2018	2	0.1678	0.1175	0.0748	0.0481	0.0321	0.0180	0.0150	24.9	32.5
7	152+350 RHS fastlane	13/2/2018	3	0.1642	0.1127	0.0776	0.0491	0.0319	0.0206	0.0159	24.9	32.5
7	151+850 RHS fastlane	13/2/2018	1	0.1487	0.1036	0.0607	0.0384	0.0259	0.0145	0.0035	24.7	32.5
7	151+850 RHS fastlane	13/2/2018	2	0.1450	0.1016	0.0594	0.0397	0.0293	0.0196	0.0098	24.7	32.5
7	151+850 RHS fastlane	13/2/2018	3	0.1410	0.0972	0.0579	0.0371	0.0250	0.0163	0.0132	24.7	32.5
7	151+350 RHS fastlane	13/2/2018	1	0.1783	0.1270	0.0733	0.0484	0.0376	0.0198	0.0193	24.8	32.5
7	151+350 RHS fastlane	13/2/2018	2	0.1775	0.1275	0.0759	0.0496	0.0384	0.0225	0.0182	24.9	32.5
7	151+350 RHS fastlane	13/2/2018	3	0.1780	0.1273	0.0762	0.0512	0.0352	0.0245	0.0201	24.9	32.5
7	150+850 RHS fastlane	13/2/2018	1	0.1360	0.0975	0.0631	0.0428	0.0263	0.0185	0.0163	25.0	32.5
7	150+850 RHS fastlane	13/2/2018	2	0.1361	0.0996	0.0652	0.0433	0.0308	0.0171	0.0171	25.0	32.5
7	150+850 RHS fastlane	13/2/2018	3	0.1335	0.0976	0.0619	0.0410	0.0275	0.0196	0.0172	25.0	32.5
7	150+350 RHS fastlane	13/2/2018	1	0.1482	0.1098	0.0686	0.0455	0.0295	0.0262	0.0170	25.2	32.5
7	150+350 RHS fastlane	13/2/2018	2	0.1427	0.1043	0.0653	0.0435	0.0313	0.0163	0.0208	25.1	32.5
7	150+350 RHS fastlane	13/2/2018	3	0.1411	0.1059	0.0651	0.0454	0.0321	0.0158	0.0190	25.1	32.5
7	149+850 RHS fastlane	13/2/2018	1	0.1757	0.1300	0.0730	0.0432	0.0322	0.0161	0.0196	25.2	32.5
7	149+850 RHS fastlane	13/2/2018	2	0.1737	0.1248	0.0681	0.0423	0.0349	0.0148	0.0175	25.2	32.5
7	149+850 RHS fastlane	13/2/2018	3	0.1722	0.1260	0.0685	0.0457	0.0384	0.0192	0.0225	25.2	32.5
7	149+350 RHS fastlane	13/2/2018	1	0.1592	0.1044	0.0533	0.0379	0.0253	0.0202	0.0149	25.3	32.5
7	149+350 RHS fastlane	13/2/2018	2	0.1515	0.1005	0.0548	0.0326	0.0261	0.0145	0.0133	25.3	32.5
7	149+350 RHS fastlane	13/2/2018	3	0.1540	0.1070	0.0456	0.0321	0.0270	0.0215	0.0200	25.3	32.5
7	148+850 RHS fastlane	13/2/2018	1	0.1640	0.1168	0.0594	0.0481	0.0345	0.0229	0.0146	25.3	32.5
7	148+850 RHS fastlane	13/2/2018	2	0.1600	0.1136	0.0616	0.0445	0.0338	0.0219	0.0109	25.3	32.5
7	148+850 RHS fastlane	13/2/2018	3	0.1594	0.1115	0.0579	0.0442	0.0357	0.0169	0.0137	25.3	32.5
7	148+350 RHS fastlane	13/2/2018	1	0.1295	0.0891	0.0541	0.0359	0.0334	0.0218	0.0163	25.3	32.5
7	148+350 RHS fastlane	13/2/2018	2	0.1304	0.0931	0.0592	0.0335	0.0283	0.0175	0.0143	25.3	32.5
7	148+350 RHS fastlane	13/2/2018	3	0.1274	0.0869	0.0604	0.0315	0.0348	0.0221	0.0127	25.3	32.5
7	147+850 RHS fastlane	13/2/2018	1	0.1319	0.0782	0.0410	0.0243	0.0140	0.0124	0.0116	25.4	32.5
7	147+850 RHS fastlane	13/2/2018	2	0.1327	0.0752	0.0413	0.0259	0.0143	0.0134	0.0051	25.4	32.5
7	147+850 RHS fastlane	13/2/2018	3	0.1349	0.0802	0.0418	0.0263	0.0165	0.0127	0.0063	25.4	32.5
7	147+350 RHS fastlane	13/2/2018	1	0.1499	0.1164	0.0717	0.0498	0.0309	0.0205	0.0162	25.4	32.5
7	147+350 RHS fastlane	13/2/2018	2	0.1496	0.1139	0.0728	0.0478	0.0325	0.0202	0.0159	25.4	32.5
7	147+350 RHS fastlane	13/2/2018	3	0.1475	0.1135	0.0722	0.0484	0.0310	0.0208	0.0145	25.4	32.5
7	146+850 RHS fastlane	13/2/2018	1	0.1035	0.0773	0.0508	0.0339	0.0284	0.0027	0.0145	25.5	32.5
7	146+850 RHS fastlane	13/2/2018	2	0.1028	0.0771	0.0522	0.0362	0.0253	0.0178	0.0089	25.5	32.5
7	146+850 RHS fastlane	13/2/2018	3	0.1045	0.0735	0.0509	0.0343	0.0261	0.0297	0.0121	25.5	32.5
7	146+350 RHS fastlane	13/2/2018	1	0.1230	0.0867	0.0563	0.0343	0.0273	0.0192	0.0213	25.5	32.5
7	146+350 RHS fastlane	13/2/2018	2	0.1231	0.0869	0.0562	0.0361	0.0244	0.0158	0.0137	25.5	32.5
7	146+350 RHS fastlane	13/2/2018	3	0.1191	0.0816	0.0556	0.0331	0.0256	0.0165	0.0135	25.5	32.5
7	145+850 RHS fastlane	13/2/2018	1	0.1170	0.0947	0.0610	0.0524	0.0303	0.0218	0.0177	25.6	32.5
7	145+850 RHS fastlane	13/2/2018	2	0.1125	0.0930	0.0599	0.0506	0.0278	0.0199	0.0191	25.6	32.5
7	145+850 RHS fastlane	13/2/2018	3	0.1129	0.0952	0.0592	0.0505	0.0293	0.0185	0.0193	25.6	32.5
7	145+350 RHS fastlane	13/2/2018	1	0.1018	0.0717	0.0436	0.0303	0.0201	0.0149	0.0139	25.5	37.5
7	145+350 RHS fastlane	13/2/2018	2	0.1007	0.0724	0.0448	0.0315	0.0200	0.0156	0.0131	25.6	37.5
7	145+350 RHS fastlane	13/2/2018	3	0.1005	0.0723	0.0454	0.0295	0.0195	0.0158	0.0135	25.5	37.5
7	144+850 RHS fastlane	13/2/2018	1	0.1834	0.1333	0.0798	0.0436	0.0322	0.0145	0.0172	25.6	37.5
7	144+850 RHS fastlane	13/2/2018	2	0.1774	0.1273	0.0636	0.0412	0.0328	0.0175	0.0175	25.6	37.5
7	144+850 RHS fastlane	13/2/2018	3	0.1747	0.1284	0.0783	0.0396	0.0344	0.0173	0.0169	25.6	37.5
7	144+350 RHS fastlane	13/2/2018	1	0.2000	0.1381	0.0714	0.0384	0.0166	0.0233	0.0116	25.5	37.5
7	144+350 RHS fastlane	13/2/2018	2	0.1964	0.1377	0.0749	0.0361	0.0203	0.0122	0.0061	25.5	37.5
7	144+350 RHS fastlane	13/2/2018	3	0.1962	0.1379	0.0751	0.0378	0.0181	0.0119	0.0059	25.5	37.5
7	143+850 RHS fastlane	13/2/2018	1	0.1400	0.0983	0.0557	0.0360	0.0249	0.0156	0.0148	25.6	37.5
7	143+850 RHS fastlane	13/2/2018	2	0.1424	0.0999	0.0571	0.0382	0.0245	0.0177	0.0134	25.6	37.5
7	143+850 RHS fastlane	13/2/2018	3	0.1387	0.0953	0.0561	0.0364	0.0254	0.0158	0.0143	25.6	37.5
7	143+350 RHS fastlane	13/2/2018	1	0.1314	0.0898	0.0556	0.0388	0.0258	0.0190	0.0157	25.7	37.5
7	143+350 RHS fastlane	13/2/2018	2	0.1287	0.0875	0.0541	0.0373	0.0252	0.0162	0.0160	25.7	37.5
7	143+350 RHS fastlane	13/2/2018	3	0.1271	0.0878	0.0548	0.0368	0.0266	0.0179	0.0153	25.7	37.5
7	142+850 RHS fastlane	13/2/2018	1	0.1194	0.0806	0.0461	0.0317	0.0225	0.0152	0.0076	25.8	37.5
7	142+850 RHS fastlane	13/2/2018	2	0.1164	0.0780	0.0463	0.0327	0.0234	0.0162	0.0081	25.8	37.5
7	142+850 RHS fastlane	13/2/2018	3	0.1219	0.0809	0.0496	0.0320	0.0236	0.0171	0.0135	25.8	37.5
7	142+350 RHS fastlane	13/2/2018	1	0.1549	0.1093	0.0642	0.0424	0.0322	0.0246	0.0183	25.9	37.5
7	142+350 RHS fastlane	13/2/2018	2	0.1623	0.1100	0.0640	0.0433	0.0314	0.0259	0.0198	25.9	37.5
7	142+350 RHS fastlane	13/2/2018	3	0.1521	0.1096	0.0634	0.0431	0.0315	0.0273	0.0199	25.9	37.5
7	141+850 RHS fastlane	13/2/2018	1	0.1316	0.0927	0.0598	0.0397	0.0291	0.0177	0.0152	25.9	37.5

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	141+850 RHS fastlane	13/2/2018	2	0.1283	0.0923	0.0596	0.0420	0.0307	0.0203	0.0176	26.0	37.5
7	141+850 RHS fastlane	13/2/2018	3	0.1257	0.0918	0.0580	0.0414	0.0304	0.0215	0.0168	25.9	37.5
7	141+350 RHS fastlane	13/2/2018	1	0.1328	0.0883	0.0509	0.0311	0.0207	0.0003	0.0036	26.0	37.5
7	141+350 RHS fastlane	13/2/2018	2	0.1348	0.0862	0.0463	0.0314	0.0185	0.0177	0.0069	26.0	37.5
7	141+350 RHS fastlane	13/2/2018	3	0.1326	0.0848	0.0514	0.0322	0.0248	0.0165	0.0135	26.0	37.5
7	140+850 RHS fastlane	13/2/2018	1	0.1706	0.1193	0.0689	0.0443	0.0284	0.0164	0.0200	26.0	37.5
7	140+850 RHS fastlane	13/2/2018	2	0.1715	0.1197	0.0678	0.0436	0.0314	0.0209	0.0227	26.0	37.5
7	140+850 RHS fastlane	13/2/2018	3	0.1659	0.1150	0.0646	0.0436	0.0277	0.0166	0.0236	26.0	37.5
7	140+350 RHS fastlane	13/2/2018	1	0.1717	0.1238	0.0703	0.0449	0.0348	0.0226	0.0330	26.0	37.5
7	140+350 RHS fastlane	13/2/2018	2	0.1719	0.1216	0.0682	0.0480	0.0303	0.0204	0.0223	26.0	37.5
7	140+350 RHS fastlane	13/2/2018	3	0.1603	0.1194	0.0720	0.0446	0.0343	0.0189	0.0117	26.0	37.5
7	139+850 RHS fastlane	13/2/2018	1	0.1181	0.0897	0.0622	0.0450	0.0342	0.0228	0.0203	26.0	37.5
7	139+850 RHS fastlane	13/2/2018	2	0.1129	0.0867	0.0595	0.0442	0.0333	0.0250	0.0173	26.0	37.5
7	139+850 RHS fastlane	13/2/2018	3	0.1153	0.0881	0.0606	0.0447	0.0340	0.0236	0.0179	26.0	37.5
7	139+350 RHS fastlane	13/2/2018	1	0.1121	0.0782	0.0508	0.0351	0.0244	0.0175	0.0149	26.0	37.5
7	139+350 RHS fastlane	13/2/2018	2	0.0959	0.0701	0.0475	0.0346	0.0267	0.0190	0.0015	26.0	37.5
7	139+350 RHS fastlane	13/2/2018	3	0.1121	0.0789	0.0513	0.0364	0.0261	0.0194	0.0198	26.0	37.5
7	138+850 RHS fastlane	13/2/2018	1	0.1481	0.1195	0.0781	0.0522	0.0413	0.0217	0.0220	26.0	37.5
7	138+850 RHS fastlane	13/2/2018	2	0.1493	0.1189	0.0784	0.0565	0.0451	0.0264	0.0251	26.1	37.5
7	138+850 RHS fastlane	13/2/2018	3	0.1518	0.1225	0.0840	0.0573	0.0438	0.0294	0.0240	26.1	37.5
7	138+350 RHS fastlane	13/2/2018	1	0.1202	0.0903	0.0584	0.0414	0.0326	0.0209	0.0194	26.1	37.5
7	138+350 RHS fastlane	13/2/2018	2	0.1176	0.0912	0.0578	0.0430	0.0312	0.0220	0.0172	26.1	37.5
7	138+350 RHS fastlane	13/2/2018	3	0.1159	0.0900	0.0586	0.0421	0.0310	0.0220	0.0167	26.1	37.5
7	137+850 RHS fastlane	13/2/2018	1	0.1268	0.0906	0.0532	0.0319	0.0182	0.0152	0.0087	26.1	37.5
7	137+850 RHS fastlane	13/2/2018	2	0.1262	0.0937	0.0539	0.0299	0.0157	0.0164	0.0208	26.1	37.5
7	137+850 RHS fastlane	13/2/2018	3	0.1256	0.0902	0.0526	0.0300	0.0164	0.0177	0.0072	26.1	37.5
7	137+350 RHS fastlane	13/2/2018	1	0.1732	0.1265	0.0802	0.0528	0.0370	0.0243	0.0186	26.0	37.5
7	137+350 RHS fastlane	13/2/2018	2	0.1769	0.1359	0.0771	0.0545	0.0317	0.0178	0.0171	26.0	37.5
7	137+350 RHS fastlane	13/2/2018	3	0.1725	0.1341	0.0792	0.0542	0.0372	0.0250	0.0206	26.0	37.5
7	136+850 RHS fastlane	13/2/2018	1	0.1020	0.0734	0.0500	0.0372	0.0259	0.0155	0.0077	26.0	37.5
7	136+850 RHS fastlane	13/2/2018	2	0.0856	0.0681	0.0469	0.0357	0.0264	0.0050	0.0178	26.0	37.5
7	136+850 RHS fastlane	13/2/2018	3	0.0967	0.0729	0.0500	0.0379	0.0240	0.0163	0.0141	26.0	37.5
7	136+350 RHS fastlane	13/2/2018	1	0.1473	0.1057	0.0570	0.0390	0.0353	0.0236	0.0168	26.0	37.5
7	136+350 RHS fastlane	13/2/2018	2	0.1444	0.0999	0.0497	0.0357	0.0379	0.0244	0.0147	26.0	37.5
7	136+350 RHS fastlane	13/2/2018	3	0.1443	0.0985	0.0481	0.0342	0.0384	0.0230	0.0162	26.0	37.5
7	135+850 RHS fastlane	13/2/2018	1	0.1262	0.0839	0.0484	0.0295	0.0197	0.0003	0.0034	26.0	37.5
7	135+850 RHS fastlane	13/2/2018	2	0.1281	0.0819	0.0440	0.0298	0.0176	0.0168	0.0066	26.0	37.5
7	135+850 RHS fastlane	13/2/2018	3	0.1260	0.0806	0.0488	0.0306	0.0236	0.0157	0.0128	26.0	37.5
7	135+850 LHS fastlane	13/2/2018	1	0.1621	0.1133	0.0655	0.0421	0.0270	0.0156	0.0190	26.0	37.5
7	135+850 LHS fastlane	13/2/2018	2	0.1629	0.1137	0.0644	0.0414	0.0298	0.0199	0.0216	26.0	37.5
7	135+850 LHS fastlane	13/2/2018	3	0.1576	0.1093	0.0614	0.0414	0.0263	0.0158	0.0224	26.0	37.5
7	136+350 LHS fastlane	13/2/2018	1	0.1480	0.1071	0.0648	0.0440	0.0324	0.0251	0.0226	25.9	37.5
7	136+350 LHS fastlane	13/2/2018	2	0.1489	0.1071	0.0648	0.0465	0.0326	0.0239	0.0213	25.8	37.5
7	136+350 LHS fastlane	13/2/2018	3	0.1483	0.1089	0.0651	0.0468	0.0367	0.0280	0.0202	25.8	37.5
7	136+850 LHS fastlane	13/2/2018	1	0.0435	0.0217	0.0348	0.0269	0.0264	0.0215	0.0277	26.4	40.1
7	136+850 LHS fastlane	13/2/2018	2	0.0471	0.0409	0.0365	0.0226	0.0266	0.0170	0.0297	26.4	40.1
7	136+850 LHS fastlane	13/2/2018	3	0.0466	0.0441	0.0360	0.0229	0.0244	0.0180	0.0287	26.4	40.1
7	137+350 LHS fastlane	13/2/2018	1	0.1798	0.1311	0.0720	0.0529	0.0418	0.0267	0.0214	26.3	40.1
7	137+850 LHS fastlane	13/2/2018	2	0.1799	0.1295	0.0728	0.0548	0.0390	0.0197	0.0206	26.3	40.1
7	137+350 LHS fastlane	13/2/2018	3	0.1796	0.1311	0.0785	0.0536	0.0354	0.0278	0.0178	26.3	40.1
7	137+850 LHS fastlane	13/2/2018	1	0.1607	0.1204	0.0698	0.0449	0.0296	0.0193	0.0151	26.1	40.1
7	137+850 LHS fastlane	13/2/2018	2	0.1544	0.1188	0.0698	0.0419	0.0243	0.0165	0.0211	26.1	40.1
7	137+850 LHS fastlane	13/2/2018	3	0.1570	0.1202	0.0712	0.0446	0.0275	0.0191	0.0182	26.1	40.1
7	138+350 LHS fastlane	13/2/2018	1	0.1806	0.1275	0.0740	0.0446	0.0385	0.0216	0.0197	26.1	40.1
7	138+350 LHS fastlane	13/2/2018	2	0.1795	0.1281	0.0758	0.0429	0.0358	0.0247	0.0230	26.1	40.1
7	138+350 LHS fastlane	13/2/2018	3	0.1801	0.1280	0.0736	0.0463	0.0378	0.0243	0.0214	26.1	40.1
7	138+850 LHS fastlane	13/2/2018	1	0.1363	0.1057	0.0674	0.0545	0.0412	0.0280	0.0224	26.0	40.1
7	138+850 LHS fastlane	13/2/2018	2	0.1359	0.1086	0.0669	0.0481	0.0391	0.0290	0.0238	26.0	40.1
7	138+850 LHS fastlane	13/2/2018	3	0.1331	0.1075	0.0679	0.0491	0.0365	0.0313	0.0233	26.1	40.1
7	139+350 LHS fastlane	13/2/2018	1	0.1401	0.1040	0.0678	0.0360	0.0371	0.0224	0.0227	26.1	40.1
7	139+350 LHS fastlane	13/2/2018	2	0.1401	0.1059	0.0690	0.0395	0.0366	0.0218	0.0231	26.1	40.1
7	139+350 LHS fastlane	13/2/2018	3	0.1380	0.1004	0.0673	0.0350	0.0407	0.0241	0.0224	26.1	40.1
7	139+850 LHS fastlane	13/2/2018	1	0.1355	0.1055	0.0711	0.0477	0.0370	0.0219	0.0232	26.1	40.1
7	139+850 LHS fastlane	13/2/2018	2	0.1389	0.1065	0.0711	0.0510	0.0393	0.0287	0.0181	26.1	40.1
7	139+850 LHS fastlane	13/2/2018	3	0.1396	0.1109	0.0756	0.0472	0.0367	0.0186	0.0230	26.2	40.1
7	140+350 LHS fastlane	13/2/2018	1	0.1608	0.1121	0.0660	0.0410	0.0254	0.0224	0.0174	26.1	40.1
7	140+350 LHS fastlane	13/2/2018	2	0.1625	0.1136	0.0683	0.0412	0.0307	0.0214	0.0198	26.1	40.1
7	140+350 LHS fastlane	13/2/2018	3	0.1624	0.1145	0.0678	0.0438	0.0288	0.0200	0.0162	26.1	40.1
7	140+850 LHS fastlane	13/2/2018	1	0.1520	0.1100	0.0577	0.0401	0.0283	0.0227	0.0183	26.1	40.1
7	140+850 LHS fastlane	13/2/2018	2	0.1472	0.1052	0.0559	0.0363	0.0294	0.0203	0.0147	26.1	40.1
7	140+850 LHS fastlane	13/2/2018	3	0.1485	0.1035	0.0591	0.0344	0.0306	0.0172	0.0206	26.1	40.1
7	141+350 LHS fastlane	13/2/2018	1	0.2063	0.1381	0.0666	0.0409	0.0266	0.0177	0.0158	26.0	40.1
7	141+350 LHS fastlane	13/2/2018	2	0.2035	0.1360	0.0688	0.0411	0.0263	0.0196	0.0157	26.0	40.1
7	141+350 LHS fastlane	13/2/2018	3	0.1944	0.1310	0.0642	0.0388	0.0217	0.0147	0.0141	26.0	40.1
7	141+850 LHS fastlane	13/2/2018	1	0.1743	0.1261	0.0740	0.0500	0.0318	0.0242	0.0175	25.9	40.1
7	141+850 LHS fastlane	13/2/2018	2	0.1727	0.1225	0.0737	0.0493	0.0307	0.0178	0.0174	25.9	40.1

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	141+850 LHS fastlane	13/2/2018	3	0.1661	0.1231	0.0722	0.0477	0.0298	0.0222	0.0149	25.9	40.1
7	142+350 LHS fastlane	13/2/2018	1	0.1204	0.0827	0.0526	0.0333	0.0219	0.0172	0.0161	26.0	40.1
7	142+350 LHS fastlane	13/2/2018	2	0.1176	0.0784	0.0454	0.0341	0.0193	0.0172	0.0246	26.0	40.1
7	142+350 LHS fastlane	13/2/2018	3	0.1172	0.0783	0.0499	0.0305	0.0191	0.0157	0.0245	26.0	40.1
7	142+850 LHS fastlane	13/2/2018	1	0.1572	0.1168	0.0685	0.0391	0.0284	0.0174	0.0118	26.1	40.1
7	142+850 LHS fastlane	13/2/2018	2	0.1568	0.1169	0.0697	0.0415	0.0287	0.0202	0.0156	26.1	40.1
7	142+850 LHS fastlane	13/2/2018	3	0.1564	0.1167	0.0698	0.0438	0.0295	0.0206	0.0173	26.1	40.1
7	143+350 LHS fastlane	13/2/2018	1	0.1582	0.1192	0.0739	0.0484	0.0261	0.0216	0.0178	26.1	40.1
7	143+350 LHS fastlane	13/2/2018	2	0.1572	0.1236	0.0786	0.0475	0.0332	0.0221	0.0174	26.1	40.1
7	143+350 LHS fastlane	13/2/2018	3	0.1570	0.1176	0.0730	0.0505	0.0337	0.0235	0.0189	26.1	40.1
7	143+850 LHS fastlane	13/2/2018	1	0.1671	0.1041	0.0549	0.0335	0.0234	0.0168	0.0176	26.1	40.1
7	143+850 LHS fastlane	13/2/2018	2	0.1601	0.1065	0.0564	0.0317	0.0191	0.0175	0.0228	26.1	40.1
7	143+850 LHS fastlane	13/2/2018	3	0.1625	0.1062	0.0589	0.0314	0.0199	0.0188	0.0179	26.1	40.1
7	144+350 LHS fastlane	13/2/2018	1	0.1056	0.0799	0.0551	0.0401	0.0266	0.0195	0.0024	26.1	40.1
7	144+350 LHS fastlane	13/2/2018	2	0.1059	0.0777	0.0527	0.0399	0.0292	0.0143	0.0144	26.1	40.1
7	144+350 LHS fastlane	13/2/2018	3	0.1038	0.0791	0.0549	0.0411	0.0276	0.0166	0.0083	26.1	40.1
7	144+850 LHS fastlane	13/2/2018	1	0.1045	0.0770	0.0542	0.0385	0.0295	0.0186	0.0157	26.1	40.1
7	144+850 LHS fastlane	13/2/2018	2	0.1064	0.0769	0.0559	0.0408	0.0288	0.0221	0.0168	26.1	40.1
7	144+850 LHS fastlane	13/2/2018	3	0.1007	0.0767	0.0534	0.0398	0.0285	0.0207	0.0171	26.1	40.1
7	145+350 LHS fastlane	13/2/2018	1	0.1593	0.1041	0.0674	0.0445	0.0260	0.0176	0.0006	26.1	40.1
7	145+350 LHS fastlane	13/2/2018	2	0.1580	0.1200	0.0701	0.0507	0.0326	0.0216	0.0173	26.1	40.1
7	145+350 LHS fastlane	13/2/2018	3	0.1555	0.1095	0.0716	0.0455	0.0279	0.0206	0.0182	26.1	40.1
7	145+850 LHS fastlane	13/2/2018	1	0.1136	0.0825	0.0574	0.0415	0.0331	0.0218	0.0184	26.0	40.1
7	145+850 LHS fastlane	13/2/2018	2	0.1125	0.0778	0.0555	0.0381	0.0261	0.0169	0.0180	26.0	40.1
7	145+850 LHS fastlane	13/2/2018	3	0.1142	0.0828	0.0578	0.0422	0.0290	0.0204	0.0170	26.0	40.1
7	146+350 LHS fastlane	13/2/2018	1	0.1936	0.1386	0.0852	0.0571	0.0417	0.0246	0.0190	26.1	40.1
7	146+350 LHS fastlane	13/2/2018	2	0.1884	0.1388	0.0837	0.0560	0.0355	0.0288	0.0192	26.0	40.1
7	146+350 LHS fastlane	13/2/2018	3	0.1907	0.1360	0.0845	0.0569	0.0361	0.0285	0.0211	26.0	40.1
7	146+850 LHS fastlane	13/2/2018	1	0.1538	0.1170	0.0756	0.0533	0.0373	0.0257	0.0198	26.0	40.1
7	146+850 LHS fastlane	13/2/2018	2	0.1525	0.1183	0.0726	0.0523	0.0365	0.0240	0.0170	26.0	40.1
7	146+850 LHS fastlane	13/2/2018	3	0.1489	0.1146	0.0723	0.0532	0.0355	0.0245	0.0181	26.0	40.1
7	147+350 LHS fastlane	13/2/2018	1	0.1481	0.1136	0.0768	0.0499	0.0363	0.0247	0.0203	26.1	40.1
7	147+350 LHS fastlane	13/2/2018	2	0.1490	0.1127	0.0736	0.0504	0.0355	0.0262	0.0231	26.1	40.1
7	147+350 LHS fastlane	13/2/2018	3	0.1457	0.1111	0.0730	0.0494	0.0361	0.0247	0.0214	26.1	40.1
7	147+850 LHS fastlane	13/2/2018	1	0.1580	0.1141	0.0694	0.0426	0.0295	0.0160	0.0135	26.1	40.1
7	147+850 LHS fastlane	13/2/2018	2	0.1624	0.1206	0.0724	0.0471	0.0330	0.0198	0.0150	26.1	40.1
7	147+850 LHS fastlane	13/2/2018	3	0.1632	0.1199	0.0723	0.0497	0.0330	0.0150	0.0161	26.1	40.1
7	148+350 LHS fastlane	13/2/2018	1	0.1318	0.0942	0.0598	0.0385	0.0266	0.0208	0.0064	26.2	40.1
7	148+350 LHS fastlane	13/2/2018	2	0.1295	0.0928	0.0598	0.0391	0.0276	0.0184	0.0147	26.2	40.1
7	148+350 LHS fastlane	13/2/2018	3	0.1294	0.0962	0.0586	0.0380	0.0258	0.0198	0.0129	26.2	40.1
7	148+850 LHS fastlane	13/2/2018	1	0.1635	0.1228	0.0781	0.0489	0.0394	0.0193	0.0136	26.2	40.1
7	148+850 LHS fastlane	13/2/2018	2	0.1639	0.1216	0.0766	0.0525	0.0374	0.0197	0.0164	26.2	40.1
7	148+850 LHS fastlane	13/2/2018	3	0.1643	0.1234	0.0788	0.0550	0.0358	0.0264	0.0230	26.2	40.1
7	149+350 LHS fastlane	13/2/2018	1	0.1491	0.1191	0.0755	0.0538	0.0346	0.0223	0.0171	26.1	40.1
7	149+350 LHS fastlane	13/2/2018	2	0.1719	0.1328	0.0854	0.0556	0.0375	0.0249	0.0198	26.1	40.1
7	149+350 LHS fastlane	13/2/2018	3	0.1726	0.1337	0.0850	0.0510	0.0338	0.0258	0.0190	26.1	40.1
7	149+850 LHS fastlane	13/2/2018	1	0.1396	0.1013	0.0563	0.0367	0.0236	0.0170	0.0085	26.1	40.1
7	149+850 LHS fastlane	13/2/2018	2	0.1391	0.1009	0.0582	0.0342	0.0231	0.0166	0.0171	26.1	40.1
7	149+850 LHS fastlane	13/2/2018	3	0.1380	0.0996	0.0601	0.0347	0.0242	0.0171	0.0173	26.1	40.1
7	150+350 LHS fastlane	13/2/2018	1	0.1319	0.1040	0.0691	0.0510	0.0355	0.0193	0.0181	26.1	42.4
7	150+350 LHS fastlane	13/2/2018	2	0.1324	0.1013	0.0698	0.0482	0.0335	0.0198	0.0204	26.1	42.4
7	150+350 LHS fastlane	13/2/2018	3	0.1327	0.1045	0.0705	0.0504	0.0334	0.0240	0.0180	26.1	42.4
7	150+850 LHS fastlane	13/2/2018	1	0.1079	0.0790	0.0544	0.0341	0.0215	0.0107	0.0108	26.2	42.4
7	150+850 LHS fastlane	13/2/2018	2	0.1082	0.0779	0.0558	0.0323	0.0168	0.0284	0.0142	26.2	42.4
7	150+850 LHS fastlane	13/2/2018	3	0.1051	0.0789	0.0525	0.0282	0.0210	0.0247	0.0037	26.2	42.4
7	151+350 LHS fastlane	13/2/2018	1	0.1496	0.1041	0.0677	0.0342	0.0242	0.0129	0.0188	26.3	42.4
7	151+350 LHS fastlane	13/2/2018	2	0.1500	0.0984	0.0697	0.0395	0.0285	0.0191	0.0171	26.3	42.4
7	151+350 LHS fastlane	13/2/2018	3	0.1494	0.0899	0.0689	0.0430	0.0280	0.0228	0.0157	26.3	42.4
7	151+850 LHS fastlane	13/2/2018	1	0.1332	0.0856	0.0605	0.0359	0.0227	0.0140	0.0164	26.1	42.4
7	151+850 LHS fastlane	13/2/2018	2	0.1296	0.0779	0.0600	0.0377	0.0218	0.0131	0.0146	26.2	42.4
7	151+850 LHS fastlane	13/2/2018	3	0.1283	0.0764	0.0600	0.0357	0.0195	0.0097	0.0179	26.2	42.4
7	152+350 LHS fastlane	13/2/2018	1	0.1423	0.0909	0.0574	0.0341	0.0236	0.0158	0.0142	26.1	42.4
7	152+350 LHS fastlane	13/2/2018	2	0.1382	0.0890	0.0573	0.0345	0.0248	0.0157	0.0139	26.2	42.4
7	152+350 LHS fastlane	13/2/2018	3	0.1380	0.0856	0.0568	0.0375	0.0239	0.0185	0.0018	26.2	42.4
7	152+850 LHS fastlane	13/2/2018	1	0.1761	0.1218	0.0813	0.0523	0.0400	0.0309	0.0204	26.2	42.4
7	152+850 LHS fastlane	13/2/2018	2	0.1771	0.1212	0.0816	0.0594	0.0402	0.0299	0.0209	26.2	42.4
7	152+850 LHS fastlane	13/2/2018	3	0.1761	0.0970	0.0834	0.0588	0.0417	0.0329	0.0256	26.2	42.4
7	153+350 LHS fastlane	13/2/2018	1	0.0861	0.0693	0.0498	0.0344	0.0272	0.0158	0.0176	26.2	42.4
7	153+350 LHS fastlane	13/2/2018	2	0.0860	0.0670	0.0501	0.0346	0.0259	0.0187	0.0139	26.2	42.4
7	153+350 LHS fastlane	13/2/2018	3	0.0844	0.0676	0.0492	0.0352	0.0255	0.0189	0.0162	26.2	42.4
7	153+850 LHS fastlane	13/2/2018	1	0.1642	0.1210	0.0684	0.0377	0.0328	0.0226	0.0204	26.4	42.4
7	153+850 LHS fastlane	13/2/2018	2	0.1682	0.1235	0.0747	0.0413	0.0336	0.0240	0.0172	26.4	42.4
7	153+850 LHS fastlane	13/2/2018	3	0.1664	0.1201	0.0715	0.0443	0.0329	0.0207	0.0232	26.4	42.4
7	154+350 LHS fastlane	13/2/2018	1	0.2027	0.1373	0.0784	0.0479	0.0302	0.0189	0.0184	26.2	42.4
7	154+350 LHS fastlane	13/2/2018	2	0.1976	0.1376	0.0774	0.0478	0.0303	0.0193	0.0219	26.2	42.4
7	154+350 LHS fastlane	13/2/2018	3	0.1963	0.1375	0.0746	0.0501	0.0310	0.0170	0.0232	26.2	42.4



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	154+850 LHS fastlane	13/2/2018	1	0.2029	0.1392	0.0815	0.0449	0.0292	0.0272	0.0186	26.2	42.4
7	154+850 LHS fastlane	13/2/2018	2	0.2037	0.1344	0.0825	0.0472	0.0334	0.0248	0.0217	26.2	42.4
7	154+850 LHS fastlane	13/2/2018	3	0.1967	0.1340	0.0833	0.0467	0.0333	0.0244	0.0184	26.2	42.4
7	155+350 LHS fastlane	13/2/2018	1	0.1546	0.1083	0.0642	0.0379	0.0309	0.0235	0.0186	26.2	42.4
7	155+350 LHS fastlane	13/2/2018	2	0.1548	0.1098	0.0623	0.0412	0.0306	0.0236	0.0174	26.2	42.4
7	155+350 LHS fastlane	13/2/2018	3	0.1586	0.1124	0.0661	0.0422	0.0311	0.0279	0.0164	26.2	42.4
7	155+850 LHS fastlane	13/2/2018	1	0.1679	0.1239	0.0733	0.0493	0.0318	0.0238	0.0179	26.2	42.4
7	155+850 LHS fastlane	13/2/2018	2	0.1573	0.1071	0.0696	0.0483	0.0287	0.0208	0.0172	26.2	42.4
7	155+850 LHS fastlane	13/2/2018	3	0.1600	0.1190	0.0697	0.0502	0.0302	0.0235	0.0181	26.2	42.4
7	156+350 LHS fastlane	13/2/2018	1	0.1123	0.0785	0.0600	0.0357	0.0282	0.0168	0.0143	26.4	42.4
7	156+350 LHS fastlane	13/2/2018	2	0.1152	0.0859	0.0616	0.0402	0.0304	0.0216	0.0162	26.4	42.4
7	156+350 LHS fastlane	13/2/2018	3	0.1126	0.0861	0.0620	0.0396	0.0293	0.0216	0.0156	26.4	42.4
7	156+850 LHS fastlane	13/2/2018	1	0.1827	0.1212	0.0625	0.0372	0.0347	0.0191	0.0188	26.4	42.4
7	156+850 LHS fastlane	13/2/2018	2	0.1776	0.1208	0.0651	0.0372	0.0318	0.0192	0.0177	26.4	42.4
7	156+850 LHS fastlane	13/2/2018	3	0.1777	0.1186	0.0623	0.0391	0.0341	0.0211	0.0205	26.4	42.4
7	157+350 LHS fastlane	13/2/2018	1	0.1813	0.1285	0.0756	0.0503	0.0347	0.0227	0.0231	26.4	42.4
7	157+350 LHS fastlane	13/2/2018	2	0.1775	0.1278	0.0788	0.0469	0.0387	0.0186	0.0206	26.4	42.4
7	157+350 LHS fastlane	13/2/2018	3	0.1750	0.1274	0.0739	0.0484	0.0345	0.0176	0.0183	26.4	42.4
7	157+850 LHS fastlane	13/2/2018	1	0.1131	0.0803	0.0547	0.0317	0.0291	0.0140	0.0248	26.3	42.4
7	157+850 LHS fastlane	13/2/2018	2	0.1127	0.0789	0.0532	0.0307	0.0281	0.0151	0.0156	26.3	42.4
7	157+850 LHS fastlane	13/2/2018	3	0.1113	0.0783	0.0526	0.0328	0.0255	0.0168	0.0006	26.3	42.4
7	158+350 LHS fastlane	13/2/2018	1	0.1293	0.0900	0.0526	0.0357	0.0230	0.0134	0.0139	26.3	42.4
7	158+350 LHS fastlane	13/2/2018	2	0.1280	0.0785	0.0543	0.0348	0.0252	0.0198	0.0133	26.3	42.4
7	158+350 LHS fastlane	13/2/2018	3	0.1308	0.0670	0.0541	0.0351	0.0231	0.0154	0.0150	26.3	42.4
7	158+850 LHS fastlane	13/2/2018	1	0.1253	0.0895	0.0621	0.0477	0.0296	0.0194	0.0211	26.4	42.4
7	158+850 LHS fastlane	13/2/2018	2	0.1251	0.0890	0.0615	0.0454	0.0281	0.0188	0.0190	26.4	42.4
7	158+850 LHS fastlane	13/2/2018	3	0.1262	0.0900	0.0635	0.0480	0.0288	0.0218	0.0210	26.4	42.4
7	159+350 LHS fastlane	13/2/2018	1	0.1290	0.0898	0.0564	0.0379	0.0234	0.0176	0.0135	26.6	42.4
7	159+350 LHS fastlane	13/2/2018	2	0.1293	0.0877	0.0539	0.0398	0.0227	0.0201	0.0035	26.6	42.4
7	159+350 LHS fastlane	13/2/2018	3	0.1282	0.0901	0.0562	0.0412	0.0221	0.0195	0.0130	26.6	42.4
7	159+850 LHS fastlane	13/2/2018	1	0.1074	0.0537	0.0433	0.0300	0.0188	0.0117	0.0028	26.8	42.4
7	159+850 LHS fastlane	13/2/2018	2	0.1061	0.0675	0.0333	0.0215	0.0163	0.0124	0.0062	26.8	42.4
7	159+850 LHS fastlane	13/2/2018	3	0.1062	0.0701	0.0448	0.0260	0.0212	0.0146	0.0143	26.8	42.4
7	160+350 LHS fastlane	13/2/2018	1	0.1497	0.1008	0.0585	0.0374	0.0238	0.0197	0.0171	27.0	42.4
7	160+350 LHS fastlane	13/2/2018	2	0.1504	0.1009	0.0597	0.0424	0.0292	0.0177	0.0191	27.0	42.4
7	160+350 LHS fastlane	13/2/2018	3	0.1431	0.0964	0.0565	0.0429	0.0305	0.0199	0.0206	27.0	42.4
7	160+850 LHS fastlane	13/2/2018	1	0.1428	0.0929	0.0588	0.0374	0.0292	0.0191	0.0165	26.9	42.4
7	160+850 LHS fastlane	13/2/2018	2	0.1360	0.0878	0.0513	0.0327	0.0240	0.0185	0.0157	26.8	42.4
7	160+850 LHS fastlane	13/2/2018	3	0.1353	0.0905	0.0475	0.0338	0.0251	0.0175	0.0171	26.8	42.4
7	161+350 LHS fastlane	13/2/2018	1	0.2027	0.1455	0.0779	0.0461	0.0387	0.0219	0.0208	27.0	42.4
7	161+350 LHS fastlane	13/2/2018	2	0.1994	0.1438	0.0786	0.0489	0.0365	0.0237	0.0207	27.0	42.4
7	161+350 LHS fastlane	13/2/2018	3	0.1996	0.1448	0.0794	0.0502	0.0357	0.0264	0.0202	27.0	42.4
7	161+850 LHS fastlane	13/2/2018	1	0.1603	0.1187	0.0754	0.0517	0.0356	0.0257	0.0205	27.0	42.4
7	161+850 LHS fastlane	13/2/2018	2	0.1557	0.1145	0.0747	0.0511	0.0350	0.0238	0.0209	27.0	42.4
7	161+850 LHS fastlane	13/2/2018	3	0.1498	0.1131	0.0705	0.0492	0.0336	0.0246	0.0200	27.0	42.4
7	161+850 LHS fastlane	13/2/2018	1	0.1821	0.1317	0.0803	0.0511	0.0327	0.0219	0.0210	26.8	42.4
7	161+850 LHS fastlane	13/2/2018	2	0.1805	0.1298	0.0807	0.0515	0.0338	0.0267	0.0195	26.9	42.4
7	161+850 LHS fastlane	13/2/2018	3	0.1779	0.1287	0.0800	0.0499	0.0319	0.0273	0.0200	26.9	42.4
7	163+350 LHS fastlane	13/2/2018	1	0.1159	0.0863	0.0536	0.0358	0.0246	0.0227	0.0136	26.8	42.4
7	163+350 LHS fastlane	13/2/2018	2	0.1202	0.0864	0.0558	0.0279	0.0266	0.0146	0.0153	26.8	42.4
7	163+350 LHS fastlane	13/2/2018	3	0.1180	0.0857	0.0544	0.0272	0.0267	0.0171	0.0127	26.8	42.4
7	163+850 LHS fastlane	13/2/2018	1	0.1541	0.1136	0.0735	0.0496	0.0392	0.0264	0.0160	26.6	42.4
7	163+850 LHS fastlane	13/2/2018	2	0.1551	0.1152	0.0741	0.0478	0.0406	0.0254	0.0195	26.6	42.4
7	163+850 LHS fastlane	13/2/2018	3	0.1513	0.1120	0.0746	0.0468	0.0371	0.0263	0.0188	26.6	42.4
7	164+350 LHS fastlane	13/2/2018	1	0.1740	0.0988	0.0632	0.0415	0.0285	0.0203	0.0170	26.7	42.4
7	164+350 LHS fastlane	13/2/2018	2	0.1777	0.1039	0.0671	0.0427	0.0308	0.0203	0.0189	26.7	42.4
7	164+350 LHS fastlane	13/2/2018	3	0.1783	0.1021	0.0651	0.0438	0.0304	0.0196	0.0158	26.7	42.4
7	164+850 LHS fastlane	13/2/2018	1	0.1387	0.0966	0.0617	0.0401	0.0305	0.0233	0.0172	26.7	42.4
7	164+850 LHS fastlane	13/2/2018	2	0.1430	0.0973	0.0639	0.0403	0.0331	0.0230	0.0175	26.7	42.4
7	164+850 LHS fastlane	13/2/2018	3	0.1374	0.0952	0.0597	0.0422	0.0328	0.0249	0.0150	26.7	42.4
7	165+350 LHS fastlane	13/2/2018	1	0.1108	0.0848	0.0600	0.0395	0.0291	0.0196	0.0179	26.9	42.4
7	165+350 LHS fastlane	13/2/2018	2	0.1128	0.0833	0.0571	0.0385	0.0252	0.0229	0.0218	26.9	42.4
7	165+350 LHS fastlane	13/2/2018	3	0.1095	0.0840	0.0574	0.0393	0.0267	0.0185	0.0207	27.0	42.4
7	165+850 LHS fastlane	13/2/2018	1	0.1300	0.0976	0.0591	0.0262	0.0216	0.0071	0.0157	26.9	43.7
7	165+850 LHS fastlane	13/2/2018	2	0.1298	0.0991	0.0597	0.0346	0.0255	0.0143	0.0164	26.9	43.7
7	165+850 LHS fastlane	13/2/2018	3	0.1285	0.0989	0.0605	0.0319	0.0277	0.0094	0.0157	26.9	43.7
7	166+350 LHS fastlane	13/2/2018	1	0.1525	0.1079	0.0591	0.0356	0.0282	0.0532	0.0266	28.3	43.9
7	166+350 LHS fastlane	13/2/2018	2	0.1519	0.1080	0.0620	0.0380	0.0263	0.0207	0.0103	28.3	43.9
7	166+350 LHS fastlane	13/2/2018	3	0.1528	0.1070	0.0603	0.0384	0.0281	0.0234	0.0117	28.3	43.9
7	166+850 LHS fastlane	13/2/2018	1	0.1453	0.0971	0.0558	0.0360	0.0250	0.0157	0.0158	27.9	43.9
7	166+850 LHS fastlane	13/2/2018	2	0.1412	0.0979	0.0584	0.0374	0.0261	0.0169	0.0142	27.9	43.9
7	166+850 LHS fastlane	13/2/2018	3	0.1405	0.0936	0.0567	0.0375	0.0248	0.0182	0.0132	27.9	43.9
7	167+350 LHS fastlane	13/2/2018	1	0.1359	0.0955	0.0616	0.0302	0.0316	0.0169	0.0154	27.1	43.9
7	167+350 LHS fastlane	13/2/2018	2	0.1381	0.0974	0.0613	0.0225	0.0207	0.0180	0.0172	27.1	43.9
7	167+350 LHS fastlane	13/2/2018	3	0.1414	0.0978	0.0640	0.0323	0.0217	0.0180	0.0191	27.1	43.9
7	167+850 LHS fastlane	13/2/2018	1	0.1764	0.1193	0.0725	0.0470	0.0303	0.0263	0.0220	27.0	43.9

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	167+850 LHS fastlane	13/2/2018	2	0.1782	0.1203	0.0745	0.0437	0.0224	0.0185	0.0178	27.1	43.9
7	167+850 LHS fastlane	13/2/2018	3	0.1724	0.1204	0.0712	0.0490	0.0276	0.0244	0.0215	27.1	43.9
7	168+350 LHS fastlane	13/2/2018	1	0.1216	0.0802	0.0501	0.0368	0.0230	0.0167	0.0135	26.9	43.9
7	168+350 LHS fastlane	13/2/2018	2	0.1169	0.0774	0.0454	0.0375	0.0194	0.0166	0.0083	27.0	43.9
7	168+350 LHS fastlane	13/2/2018	3	0.1164	0.0787	0.0442	0.0342	0.0215	0.0160	0.0149	27.0	43.9
7	168+850 LHS fastlane	13/2/2018	1	0.1196	0.0814	0.0485	0.0343	0.0230	0.0179	0.0151	27.1	43.9
7	168+850 LHS fastlane	13/2/2018	2	0.1180	0.0806	0.0483	0.0337	0.0235	0.0190	0.0142	27.1	43.9
7	168+850 LHS fastlane	13/2/2018	3	0.1133	0.0807	0.0466	0.0341	0.0232	0.0199	0.0139	27.2	43.9
7	169+350 LHS fastlane	13/2/2018	1	0.1315	0.0892	0.0567	0.0400	0.0252	0.0214	0.0150	27.1	43.9
7	169+350 LHS fastlane	13/2/2018	2	0.1328	0.0862	0.0571	0.0392	0.0267	0.0198	0.0185	27.1	43.9
7	169+350 LHS fastlane	13/2/2018	3	0.1308	0.0870	0.0574	0.0403	0.0292	0.0199	0.0186	27.1	43.9
7	169+850 LHS fastlane	13/2/2018	1	0.1432	0.1025	0.0633	0.0423	0.0280	0.0197	0.0146	26.9	43.9
7	169+850 LHS fastlane	13/2/2018	2	0.1407	0.1012	0.0622	0.0419	0.0276	0.0182	0.0148	26.9	43.9
7	169+850 LHS fastlane	13/2/2018	3	0.1402	0.1024	0.0627	0.0426	0.0277	0.0202	0.0145	26.9	43.9
7	170+350 LHS fastlane	13/2/2018	1	0.1655	0.1157	0.0679	0.0446	0.0281	0.0188	0.0151	26.8	43.9
7	170+350 LHS fastlane	13/2/2018	2	0.1707	0.1188	0.0705	0.0454	0.0285	0.0203	0.0152	26.8	43.9
7	170+350 LHS fastlane	13/2/2018	3	0.1718	0.1202	0.0712	0.0459	0.0284	0.0213	0.0153	26.8	43.9
7	170+850 LHS fastlane	13/2/2018	1	0.1575	0.1156	0.0688	0.0442	0.0453	0.0335	0.0204	26.8	43.9
7	170+850 LHS fastlane	13/2/2018	2	0.1624	0.1176	0.0750	0.0498	0.0427	0.0362	0.0241	26.8	43.9
7	170+850 LHS fastlane	13/2/2018	3	0.1591	0.1177	0.0734	0.0479	0.0362	0.0331	0.0235	26.8	43.9
7	171+350 LHS fastlane	13/2/2018	1	0.1382	0.0980	0.0637	0.0363	0.0347	0.0226	0.0218	26.8	43.9
7	171+350 LHS fastlane	13/2/2018	2	0.1399	0.0948	0.0608	0.0435	0.0291	0.0241	0.0215	26.8	43.9
7	171+350 LHS fastlane	13/2/2018	3	0.1366	0.0988	0.0605	0.0388	0.0273	0.0187	0.0217	26.8	43.9
7	171+850 LHS fastlane	13/2/2018	1	0.1204	0.0864	0.0522	0.0374	0.0243	0.0167	0.0198	26.9	43.9
7	171+850 LHS fastlane	13/2/2018	2	0.1180	0.0890	0.0532	0.0379	0.0243	0.0179	0.0222	26.9	43.9
7	171+850 LHS fastlane	13/2/2018	3	0.1209	0.0861	0.0531	0.0392	0.0237	0.0175	0.0218	26.9	43.9
7	172+350 LHS fastlane	13/2/2018	1	0.1168	0.0784	0.0530	0.0342	0.0252	0.0224	0.0191	26.8	43.9
7	172+350 LHS fastlane	13/2/2018	2	0.1134	0.0797	0.0555	0.0375	0.0283	0.0208	0.0198	26.7	43.9
7	172+350 LHS fastlane	13/2/2018	3	0.1103	0.0791	0.0536	0.0373	0.0263	0.0214	0.0204	26.7	43.9
7	172+850 LHS fastlane	13/2/2018	1	0.1932	0.1361	0.0744	0.0459	0.0326	0.0221	0.0205	26.6	43.9
7	172+850 LHS fastlane	13/2/2018	2	0.1894	0.1377	0.0765	0.0480	0.0332	0.0200	0.0186	26.6	43.9
7	172+850 LHS fastlane	13/2/2018	3	0.1909	0.1348	0.0727	0.0478	0.0274	0.0183	0.0213	26.6	43.9
7	173+350 LHS fastlane	13/2/2018	1	0.1753	0.1253	0.0763	0.0504	0.0356	0.0251	0.0237	26.6	43.9
7	173+350 LHS fastlane	13/2/2018	2	0.1750	0.1204	0.0746	0.0489	0.0367	0.0261	0.0223	26.6	43.9
7	173+350 LHS fastlane	13/2/2018	3	0.1757	0.1237	0.0767	0.0530	0.0366	0.0263	0.0206	26.6	43.9
7	173+850 LHS fastlane	13/2/2018	1	0.2256	0.1554	0.0885	0.0548	0.0384	0.0263	0.0220	26.7	43.9
7	173+850 LHS fastlane	13/2/2018	2	0.2247	0.1567	0.0895	0.0571	0.0386	0.0273	0.0224	26.7	43.9
7	173+850 LHS fastlane	13/2/2018	3	0.2221	0.1559	0.0889	0.0576	0.0387	0.0266	0.0223	26.7	43.9
7	173+850 LHS fastlane	13/2/2018	1	0.1025	0.0682	0.0435	0.0303	0.0225	0.0136	0.0139	26.9	43.9
7	173+850 LHS fastlane	13/2/2018	2	0.0995	0.0670	0.0426	0.0307	0.0211	0.0140	0.0127	26.9	43.9
7	173+850 LHS fastlane	13/2/2018	3	0.1012	0.0693	0.0436	0.0297	0.0217	0.0161	0.0148	26.9	43.9
7	174+850 LHS fastlane	13/2/2018	1	0.1673	0.1132	0.0672	0.0491	0.0363	0.0326	0.0218	27.2	43.9
7	174+850 LHS fastlane	13/2/2018	2	0.1677	0.1142	0.0678	0.0490	0.0358	0.0301	0.0259	27.2	43.9
7	174+850 LHS fastlane	13/2/2018	3	0.1638	0.1102	0.0677	0.0462	0.0368	0.0260	0.0207	27.2	43.9
7	175+350 LHS fastlane	13/2/2018	1	0.1574	0.1074	0.0613	0.0435	0.0273	0.0167	0.0163	27.0	43.9
7	175+350 LHS fastlane	13/2/2018	2	0.1624	0.1104	0.0606	0.0449	0.0302	0.0214	0.0200	27.0	43.9
7	175+350 LHS fastlane	13/2/2018	3	0.1643	0.1118	0.0613	0.0460	0.0304	0.0212	0.0179	27.0	43.9
7	176+350 LHS fastlane	13/2/2018	1	0.1529	0.1041	0.0655	0.0461	0.0345	0.0255	0.0219	26.7	43.9
7	176+350 LHS fastlane	13/2/2018	2	0.1472	0.1052	0.0646	0.0461	0.0351	0.0262	0.0210	26.7	43.9
7	176+350 LHS fastlane	13/2/2018	3	0.1485	0.1032	0.0649	0.0491	0.0339	0.0254	0.0207	26.7	43.9
7	176+850 LHS fastlane	13/2/2018	1	0.1758	0.1312	0.0787	0.0514	0.0325	0.0228	0.0186	26.8	43.9
7	176+850 LHS fastlane	13/2/2018	2	0.1779	0.1309	0.0796	0.0546	0.0324	0.0237	0.0193	26.8	43.9
7	176+850 LHS fastlane	13/2/2018	3	0.1819	0.1289	0.0785	0.0527	0.0331	0.0222	0.0173	26.8	43.9
7	177+350 LHS fastlane	13/2/2018	1	0.1569	0.1140	0.0669	0.0486	0.0303	0.0156	0.0078	27.0	43.9
7	177+350 LHS fastlane	13/2/2018	2	0.1560	0.1126	0.0685	0.0486	0.0292	0.0173	0.0086	26.9	43.9
7	177+350 LHS fastlane	13/2/2018	3	0.1543	0.1114	0.0709	0.0495	0.0283	0.0187	0.0093	27.0	43.9
7	177+850 LHS fastlane	13/2/2018	1	0.1411	0.0910	0.0541	0.0372	0.0275	0.0182	0.0164	27.0	43.9
7	177+850 LHS fastlane	13/2/2018	2	0.1364	0.0918	0.0548	0.0387	0.0234	0.0170	0.0172	27.0	43.9
7	177+850 LHS fastlane	13/2/2018	3	0.1374	0.0903	0.0551	0.0362	0.0287	0.0179	0.0155	27.0	43.9
7	178+350 LHS fastlane	13/2/2018	1	0.1195	0.0806	0.0509	0.0351	0.0280	0.0142	0.0005	26.9	43.9
7	178+350 LHS fastlane	13/2/2018	2	0.1152	0.0799	0.0487	0.0356	0.0203	0.0179	0.0141	26.8	43.9
7	178+350 LHS fastlane	13/2/2018	3	0.1144	0.0824	0.0478	0.0335	0.0282	0.0179	0.0038	26.8	43.9
7	178+850 LHS fastlane	13/2/2018	1	0.1799	0.1255	0.0582	0.0406	0.0350	0.0159	0.0168	27.1	43.9
7	178+850 LHS fastlane	13/2/2018	2	0.1804	0.1250	0.0709	0.0457	0.0379	0.0154	0.0168	27.1	43.9
7	178+850 LHS fastlane	13/2/2018	3	0.1798	0.1285	0.0687	0.0476	0.0358	0.0172	0.0156	27.1	43.9
7	179+350 LHS fastlane	13/2/2018	1	0.2024	0.1465	0.0896	0.0629	0.0428	0.0255	0.0127	27.1	43.1
7	179+350 LHS fastlane	13/2/2018	2	0.2052	0.1512	0.0949	0.0611	0.0505	0.0245	0.0122	27.1	43.1
7	179+350 LHS fastlane	13/2/2018	3	0.2001	0.1507	0.0885	0.0646	0.0442	0.0187	0.0093	27.1	43.1
7	179+350 LHS fastlane	13/2/2018	1	0.1628	0.1138	0.0710	0.0453	0.0364	0.0207	0.0211	27.1	43.1
7	179+350 LHS fastlane	13/2/2018	2	0.1552	0.1120	0.0689	0.0447	0.0347	0.0224	0.0189	27.0	43.1
7	179+350 LHS fastlane	13/2/2018	3	0.1571	0.1087	0.0682	0.0443	0.0384	0.0261	0.0192	27.0	43.1
7	180+350 LHS fastlane	13/2/2018	1	0.1527	0.1041	0.0569	0.0350	0.0287	0.0276	0.0182	27.0	43.1
7	180+350 LHS fastlane	13/2/2018	2	0.1475	0.0986	0.0563	0.0300	0.0284	0.0236	0.0236	26.9	43.1
7	180+350 LHS fastlane	13/2/2018	3	0.1499	0.0971	0.0613	0.0419	0.0314	0.0138	0.0069	26.9	43.1
7	180+850 LHS fastlane	13/2/2018	1	0.1963	0.1289	0.0571	0.0326	0.0544	0.0272	0.0185	26.8	43.1
7	180+850 LHS fastlane	13/2/2018	2	0.1997	0.1308	0.0722	0.0481	0.0414	0.0241	0.0204	26.8	43.1

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	180+850 LHS fastlane	13/2/2018	3	0.1927	0.1272	0.0670	0.0463	0.0389	0.0259	0.0155	26.8	43.1
7	181+350 LHS fastlane	13/2/2018	1	0.1596	0.1177	0.0646	0.0320	0.0385	0.0181	0.0168	26.9	43.1
7	181+350 LHS fastlane	13/2/2018	2	0.1590	0.1138	0.0655	0.0391	0.0321	0.0226	0.0133	26.9	43.1
7	181+350 LHS fastlane	13/2/2018	3	0.1559	0.1142	0.0626	0.0362	0.0323	0.0223	0.0137	26.8	43.1
7	181+850 LHS fastlane	13/2/2018	1	0.1969	0.1360	0.0719	0.0484	0.0346	0.0183	0.0146	26.9	43.1
7	181+850 LHS fastlane	13/2/2018	2	0.1934	0.1346	0.0700	0.0489	0.0427	0.0222	0.0156	26.9	43.1
7	181+850 LHS fastlane	13/2/2018	3	0.1949	0.1337	0.0680	0.0477	0.0326	0.0190	0.0131	26.9	43.1
7	182+350 LHS fastlane	13/2/2018	1	0.1740	0.1176	0.0713	0.0483	0.0371	0.0243	0.0216	27.0	43.1
7	182+350 LHS fastlane	13/2/2018	2	0.1685	0.1189	0.0724	0.0486	0.0418	0.0276	0.0195	27.0	43.1
7	182+350 LHS fastlane	13/2/2018	3	0.1681	0.1221	0.0714	0.0486	0.0319	0.0233	0.0212	27.0	43.1
7	182+850 LHS fastlane	13/2/2018	1	0.1872	0.1281	0.0851	0.0482	0.0430	0.0312	0.0156	27.0	43.1
7	182+850 LHS fastlane	13/2/2018	2	0.1856	0.1267	0.0893	0.0526	0.0460	0.0302	0.0151	27.0	43.1
7	182+850 LHS fastlane	13/2/2018	3	0.1843	0.1256	0.0857	0.0455	0.0356	0.0329	0.0164	26.9	43.1
7	183+350 LHS fastlane	13/2/2018	1	0.1866	0.1370	0.0825	0.0506	0.0407	0.0302	0.0226	27.0	43.1
7	183+350 LHS fastlane	13/2/2018	2	0.1865	0.1321	0.0818	0.0544	0.0380	0.0274	0.0227	26.9	43.1
7	183+350 LHS fastlane	13/2/2018	3	0.1846	0.1351	0.0831	0.0537	0.0382	0.0304	0.0240	26.9	43.1
7	183+850 LHS fastlane	13/2/2018	1	0.2534	0.1730	0.0961	0.0598	0.0490	0.0334	0.0294	27.1	43.1
7	183+850 LHS fastlane	13/2/2018	2	0.2477	0.1662	0.0917	0.0610	0.0511	0.0351	0.0259	27.0	43.1
7	183+850 LHS fastlane	13/2/2018	3	0.2436	0.1650	0.0881	0.0607	0.0493	0.0375	0.0340	27.0	43.1
7	184+350 LHS fastlane	13/2/2018	1	0.1872	0.1227	0.0714	0.0454	0.0369	0.0265	0.0170	27.1	43.1
7	184+350 LHS fastlane	13/2/2018	2	0.1875	0.1218	0.0733	0.0468	0.0352	0.0252	0.0215	27.1	43.1
7	184+350 LHS fastlane	13/2/2018	3	0.1835	0.1182	0.0713	0.0471	0.0314	0.0254	0.0217	27.1	43.1
7	184+850 LHS fastlane	13/2/2018	1	0.1948	0.1243	0.0635	0.0426	0.0213	0.0241	0.0159	27.1	43.1
7	184+850 LHS fastlane	13/2/2018	2	0.1934	0.1252	0.0665	0.0406	0.0327	0.0231	0.0235	27.1	43.1
7	184+850 LHS fastlane	13/2/2018	3	0.1875	0.1224	0.0606	0.0430	0.0344	0.0202	0.0189	27.1	43.1
7	185+350 LHS fastlane	13/2/2018	1	0.2316	0.1566	0.0853	0.0542	0.0483	0.0326	0.0330	27.0	43.1
7	185+350 LHS fastlane	13/2/2018	2	0.2269	0.1595	0.0925	0.0517	0.0482	0.0342	0.0313	27.0	43.1
7	185+350 LHS fastlane	13/2/2018	3	0.2271	0.1618	0.0932	0.0516	0.0477	0.0374	0.0320	27.0	43.1
7	185+850 LHS fastlane	13/2/2018	1	0.1843	0.1365	0.0835	0.0523	0.0445	0.0298	0.0279	27.0	43.1
7	185+850 LHS fastlane	13/2/2018	2	0.1848	0.1384	0.0767	0.0506	0.0464	0.0340	0.0273	27.0	43.1
7	185+850 LHS fastlane	13/2/2018	3	0.1847	0.1343	0.0812	0.0589	0.0417	0.0311	0.0296	27.0	43.1
7	186+350 LHS fastlane	13/2/2018	1	0.1590	0.1171	0.0734	0.0489	0.0287	0.0216	0.0217	27.0	43.1
7	186+350 LHS fastlane	13/2/2018	2	0.1561	0.1161	0.0710	0.0502	0.0431	0.0350	0.0241	27.0	43.1
7	186+350 LHS fastlane	13/2/2018	3	0.1555	0.1165	0.0721	0.0461	0.0465	0.0855	0.0261	27.0	43.1
7	186+850 LHS fastlane	13/2/2018	1	0.2001	0.1469	0.0872	0.0600	0.0465	0.0299	0.0264	27.1	43.1
7	186+850 LHS fastlane	13/2/2018	2	0.2020	0.1482	0.0894	0.0611	0.0448	0.0373	0.0276	27.1	43.1
7	186+850 LHS fastlane	13/2/2018	3	0.2026	0.1432	0.0894	0.0594	0.0454	0.0328	0.0260	27.1	43.1
7	187+350 LHS fastlane	13/2/2018	1	0.2262	0.1485	0.0844	0.0555	0.0400	0.0300	0.0249	27.1	43.1
7	187+350 LHS fastlane	13/2/2018	2	0.2222	0.1458	0.0838	0.0545	0.0405	0.0321	0.0200	27.1	43.1
7	187+350 LHS fastlane	13/2/2018	3	0.2135	0.1406	0.0816	0.0544	0.0405	0.0322	0.0285	27.1	43.1
7	187+850 LHS fastlane	13/2/2018	1	0.2114	0.1507	0.0861	0.0601	0.0429	0.0376	0.0272	27.1	43.1
7	187+850 LHS fastlane	13/2/2018	2	0.2106	0.1490	0.0865	0.0609	0.0443	0.0346	0.0281	27.0	43.1
7	187+850 LHS fastlane	13/2/2018	3	0.2136	0.1486	0.0904	0.0604	0.0450	0.0323	0.0263	27.0	43.1
7	188+350 LHS fastlane	13/2/2018	1	0.1441	0.1058	0.0610	0.0513	0.0358	0.0233	0.0116	27.0	43.1
7	188+350 LHS fastlane	13/2/2018	2	0.1444	0.1039	0.0653	0.0511	0.0375	0.0262	0.0131	27.0	43.1
7	188+350 LHS fastlane	13/2/2018	3	0.1404	0.1040	0.0686	0.0515	0.0395	0.0278	0.0139	27.0	43.1
7	188+850 LHS fastlane	13/2/2018	1	0.2082	0.1398	0.0831	0.0484	0.0394	0.0337	0.0290	27.0	43.1
7	188+850 LHS fastlane	13/2/2018	2	0.2118	0.1443	0.0838	0.0501	0.0431	0.0390	0.0332	27.0	43.1
7	188+850 LHS fastlane	13/2/2018	3	0.2146	0.1451	0.0859	0.0541	0.0457	0.0356	0.0257	27.0	43.1
7	189+350 LHS fastlane	13/2/2018	1	0.2315	0.1622	0.0886	0.0652	0.0519	0.0372	0.0230	27.0	43.1
7	189+350 LHS fastlane	13/2/2018	2	0.2289	0.1594	0.0846	0.0655	0.0522	0.0365	0.0312	26.9	43.1
7	189+350 LHS fastlane	13/2/2018	3	0.2283	0.1617	0.0851	0.0661	0.0535	0.0380	0.0323	26.9	43.1
7	189+850 LHS fastlane	13/2/2018	1	0.1202	0.0816	0.0469	0.0378	0.0311	0.0259	0.0161	27.0	43.1
7	189+850 LHS fastlane	13/2/2018	2	0.1238	0.0850	0.0552	0.0398	0.0308	0.0279	0.0192	27.0	43.1
7	189+850 LHS fastlane	13/2/2018	3	0.1243	0.0822	0.0539	0.0419	0.0319	0.0228	0.0205	26.9	43.1
7	190+350 LHS fastlane	13/2/2018	1	0.2511	0.1809	0.0932	0.0725	0.0579	0.0374	0.0310	26.9	43.1
7	190+350 LHS fastlane	13/2/2018	2	0.2561	0.1816	0.0961	0.0745	0.0612	0.0389	0.0270	26.9	43.1
7	190+350 LHS fastlane	13/2/2018	3	0.2607	0.1858	0.0990	0.0732	0.0573	0.0385	0.0319	27.0	43.1
7	190+850 LHS fastlane	13/2/2018	1	0.1902	0.1305	0.0725	0.0502	0.0321	0.0244	0.0198	26.9	43.1
7	190+850 LHS fastlane	13/2/2018	2	0.1911	0.1324	0.0743	0.0526	0.0398	0.0222	0.0184	26.9	43.1
7	190+850 LHS fastlane	13/2/2018	3	0.1865	0.1234	0.0731	0.0452	0.0333	0.0259	0.0275	26.9	43.1
7	191+350 LHS fastlane	13/2/2018	1	0.1511	0.1120	0.0597	0.0472	0.0404	0.0212	0.0106	26.9	43.1
7	191+350 LHS fastlane	13/2/2018	2	0.1516	0.1156	0.0630	0.0499	0.0330	0.0189	0.0094	26.9	43.1
7	191+350 LHS fastlane	13/2/2018	3	0.1512	0.1093	0.0631	0.0522	0.0383	0.0262	0.0131	26.9	43.1
7	191+850 LHS fastlane	13/2/2018	1	0.1739	0.1267	0.0742	0.0513	0.0389	0.0289	0.0144	26.9	43.1
7	191+850 LHS fastlane	13/2/2018	2	0.1728	0.1279	0.0715	0.0422	0.0403	0.0268	0.0134	26.9	43.1
7	191+850 LHS fastlane	13/2/2018	3	0.1657	0.1239	0.0764	0.0541	0.0412	0.0312	0.0156	26.9	43.1
7	192+350 LHS fastlane	13/2/2018	1	0.1920	0.1449	0.0905	0.0538	0.0439	0.0310	0.0155	26.8	43.1
7	192+350 LHS fastlane	13/2/2018	2	0.1924	0.1467	0.0894	0.0610	0.0445	0.0373	0.0186	26.8	43.1
7	192+350 LHS fastlane	13/2/2018	3	0.1896	0.1422	0.0919	0.0561	0.0437	0.0354	0.0177	26.8	43.1
7	192+850 LHS fastlane	13/2/2018	1	0.1630	0.1188	0.0757	0.0500	0.0354	0.0245	0.0122	26.7	43.1
7	192+850 LHS fastlane	13/2/2018	2	0.1595	0.1262	0.0675	0.0455	0.0388	0.0164	0.0082	26.8	43.1
7	192+850 LHS fastlane	13/2/2018	3	0.1597	0.1207	0.0669	0.0379	0.0421	0.0158	0.0079	26.7	43.1
7	193+350 LHS fastlane	13/2/2018	1	0.2183	0.1528	0.0884	0.0572	0.0495	0.0280	0.0140	26.7	43.1
7	193+350 LHS fastlane	13/2/2018	2	0.2178	0.1525	0.0873	0.0516	0.0441	0.0257	0.0128	26.7	43.1
7	193+350 LHS fastlane	13/2/2018	3	0.2211	0.1537	0.0935	0.0627	0.0507	0.0327	0.0185	26.7	43.1



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	193+850 LHS fastlane	13/2/2018	1	0.1361	0.0977	0.0591	0.0392	0.0256	0.0166	0.0083	26.7	41.4
7	193+850 LHS fastlane	13/2/2018	2	0.1350	0.0975	0.0594	0.0409	0.0267	0.0181	0.0090	26.7	41.4
7	193+850 LHS fastlane	13/2/2018	3	0.1326	0.0951	0.0592	0.0392	0.0301	0.0134	0.0067	26.7	41.4
7	194+350 LHS fastlane	13/2/2018	1	0.1725	0.1171	0.0677	0.0483	0.0352	0.0264	0.0252	26.7	41.4
7	194+350 LHS fastlane	13/2/2018	2	0.1754	0.1151	0.0715	0.0479	0.0367	0.0262	0.0219	26.7	41.4
7	194+350 LHS fastlane	13/2/2018	3	0.1715	0.1160	0.0711	0.0493	0.0354	0.0264	0.0255	26.7	41.4
7	194+850 LHS fastlane	13/2/2018	1	0.2209	0.1605	0.0981	0.0717	0.0462	0.0293	0.0300	26.7	41.4
7	194+850 LHS fastlane	13/2/2018	2	0.2252	0.1663	0.1020	0.0632	0.0530	0.0371	0.0313	26.7	41.4
7	194+850 LHS fastlane	13/2/2018	3	0.2224	0.1648	0.1005	0.0653	0.0498	0.0355	0.0324	26.7	41.4
7	195+350 LHS fastlane	13/2/2018	1	0.1829	0.1187	0.0673	0.0454	0.0409	0.0318	0.0159	26.6	41.4
7	195+350 LHS fastlane	13/2/2018	2	0.1776	0.1163	0.0654	0.0467	0.0406	0.0285	0.0142	26.6	41.4
7	195+350 LHS fastlane	13/2/2018	3	0.1754	0.1148	0.0665	0.0480	0.0400	0.0334	0.0167	26.6	41.4
7	195+850 LHS fastlane	13/2/2018	1	0.1626	0.1027	0.0532	0.0331	0.0257	0.0185	0.0209	26.5	41.4
7	195+850 LHS fastlane	13/2/2018	2	0.1610	0.1002	0.0558	0.0378	0.0487	0.0236	0.0190	26.5	41.4
7	195+850 LHS fastlane	13/2/2018	3	0.1607	0.1062	0.0578	0.0354	0.0295	0.0232	0.0220	26.5	41.4
7	196+350 LHS fastlane	13/2/2018	1	0.1351	0.0861	0.0554	0.0448	0.0382	0.0191	0.0095	26.5	41.4
7	196+350 LHS fastlane	13/2/2018	2	0.1338	0.0824	0.0531	0.0408	0.0364	0.0182	0.0091	26.5	41.4
7	196+350 LHS fastlane	13/2/2018	3	0.1343	0.0846	0.0507	0.0423	0.0523	0.0261	0.0130	26.5	41.4
7	196+850 LHS fastlane	13/2/2018	1	0.1359	0.0925	0.0559	0.0421	0.0246	0.0191	0.0288	26.5	41.4
7	196+850 LHS fastlane	13/2/2018	2	0.1343	0.0927	0.0585	0.0410	0.0223	0.0153	0.0076	26.5	41.4
7	196+850 LHS fastlane	13/2/2018	3	0.1325	0.0910	0.0545	0.0417	0.0307	0.0161	0.0080	26.5	41.4
7	197+350 LHS fastlane	13/2/2018	1	0.1862	0.1329	0.0749	0.0529	0.0494	0.0120	0.0244	26.4	41.4
7	197+350 LHS fastlane	13/2/2018	2	0.1830	0.1265	0.0735	0.0491	0.0439	0.0240	0.0183	26.4	41.4
7	197+350 LHS fastlane	13/2/2018	3	0.1848	0.1301	0.0751	0.0510	0.0459	0.0196	0.0227	26.4	41.4
7	197+850 LHS fastlane	13/2/2018	1	0.1773	0.1311	0.0831	0.0521	0.0488	0.0244	0.0122	26.4	41.4
7	197+850 LHS fastlane	13/2/2018	2	0.1766	0.1326	0.0826	0.0474	0.0499	0.0249	0.0124	26.4	41.4
7	197+850 LHS fastlane	13/2/2018	3	0.1760	0.1289	0.0861	0.0586	0.0500	0.0250	0.0125	26.4	41.4
7	198+350 LHS fastlane	13/2/2018	1	0.1388	0.1041	0.0630	0.0455	0.0298	0.0226	0.0113	26.4	41.4
7	198+350 LHS fastlane	13/2/2018	2	0.1358	0.0996	0.0630	0.0443	0.0308	0.0191	0.0095	26.4	41.4
7	198+350 LHS fastlane	13/2/2018	3	0.1358	0.0972	0.0627	0.0443	0.0279	0.0252	0.0126	26.4	41.4
7	198+850 LHS fastlane	13/2/2018	1	0.1926	0.1358	0.0746	0.0470	0.0359	0.0180	0.0168	26.3	41.4
7	198+850 LHS fastlane	13/2/2018	2	0.1912	0.1306	0.0745	0.0493	0.0388	0.0240	0.0216	26.4	41.4
7	198+850 LHS fastlane	13/2/2018	3	0.1902	0.1337	0.0722	0.0466	0.0295	0.0147	0.0174	26.3	41.4
7	199+350 LHS fastlane	13/2/2018	1	0.1721	0.1197	0.0692	0.0422	0.0276	0.0209	0.0104	26.2	41.4
7	199+350 LHS fastlane	13/2/2018	2	0.1689	0.1159	0.0670	0.0415	0.0287	0.0168	0.0155	26.2	41.4
7	199+350 LHS fastlane	13/2/2018	3	0.1702	0.1188	0.0628	0.0454	0.0300	0.0212	0.0305	26.2	41.4
7	199+850 LHS fastlane	13/2/2018	1	0.2018	0.1436	0.0823	0.0578	0.0384	0.0251	0.0125	26.3	41.4
7	199+850 LHS fastlane	13/2/2018	2	0.2027	0.1430	0.0837	0.0552	0.0380	0.0249	0.0124	26.3	41.4
7	199+850 LHS fastlane	13/2/2018	3	0.1990	0.1410	0.0840	0.0594	0.0392	0.0318	0.0159	26.3	41.4
7	200+350 LHS fastlane	13/2/2018	1	0.1173	0.0808	0.0462	0.0351	0.0258	0.0156	0.0145	26.3	41.4
7	200+350 LHS fastlane	13/2/2018	2	0.1151	0.0780	0.0485	0.0353	0.0268	0.0170	0.0152	26.3	41.4
7	200+350 LHS fastlane	13/2/2018	3	0.1115	0.0778	0.0480	0.0353	0.0256	0.0181	0.0147	26.3	41.4
7	200+850 LHS fastlane	13/2/2018	1	0.1535	0.1036	0.0617	0.0371	0.0259	0.0190	0.0144	26.1	41.4
7	200+850 LHS fastlane	13/2/2018	2	0.1459	0.1014	0.0581	0.0372	0.0262	0.0202	0.0140	26.2	41.4
7	200+850 LHS fastlane	13/2/2018	3	0.1453	0.1016	0.0579	0.0382	0.0260	0.0178	0.0152	26.2	41.4
7	201+350 LHS fastlane	13/2/2018	1	0.2392	0.1679	0.0954	0.0557	0.0528	0.0302	0.0250	26.2	41.4
7	201+350 LHS fastlane	13/2/2018	2	0.2419	0.1697	0.0981	0.0579	0.0512	0.0313	0.0264	26.2	41.4
7	201+350 LHS fastlane	13/2/2018	3	0.2428	0.1664	0.0947	0.0650	0.0494	0.0382	0.0308	26.2	41.4
7	201+850 LHS fastlane	13/2/2018	1	0.1684	0.0751	0.0714	0.0476	0.0355	0.0251	0.0213	26.3	41.4
7	201+850 LHS fastlane	13/2/2018	2	0.1700	0.0743	0.0736	0.0507	0.0345	0.0269	0.0239	26.2	41.4
7	201+850 LHS fastlane	13/2/2018	3	0.1686	0.1192	0.0769	0.0478	0.0361	0.0267	0.0232	26.2	41.4
7	202+350 LHS fastlane	13/2/2018	1	0.1737	0.1132	0.0696	0.0441	0.0268	0.0134	0.0067	26.3	41.4
7	202+350 LHS fastlane	13/2/2018	2	0.1703	0.1222	0.0682	0.0466	0.0272	0.0136	0.0068	26.3	41.4
7	202+350 LHS fastlane	13/2/2018	3	0.1654	0.1198	0.0663	0.0423	0.0242	0.0121	0.0060	26.3	41.4
7	202+850 LHS fastlane	13/2/2018	1	0.1862	0.1194	0.0758	0.0368	0.0332	0.0174	0.0207	26.4	41.4
7	202+850 LHS fastlane	13/2/2018	2	0.1862	0.1284	0.0751	0.0468	0.0323	0.0156	0.0213	26.3	41.4
7	202+850 LHS fastlane	13/2/2018	3	0.1868	0.1305	0.0764	0.0454	0.0334	0.0167	0.0207	26.3	41.4
7	203+350 LHS fastlane	13/2/2018	1	0.1348	0.0991	0.0598	0.0373	0.0291	0.0193	0.0096	26.3	41.4
7	203+350 LHS fastlane	13/2/2018	2	0.1319	0.0973	0.0634	0.0380	0.0282	0.0214	0.0107	26.3	41.4
7	203+350 LHS fastlane	13/2/2018	3	0.1324	0.1024	0.0578	0.0438	0.0291	0.0222	0.0111	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	1	0.2265	0.1677	0.0966	0.0588	0.0356	0.0286	0.0183	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	2	0.2255	0.1660	0.0968	0.0585	0.0352	0.0258	0.0236	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	3	0.2222	0.1674	0.1000	0.0647	0.0357	0.0282	0.0183	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	1	0.1192	0.0801	0.0514	0.0383	0.0257	0.0186	0.0170	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	2	0.1139	0.0759	0.0502	0.0374	0.0253	0.0188	0.0164	26.3	41.4
7	204+350 LHS fastlane	13/2/2018	3	0.1167	0.0775	0.0514	0.0367	0.0258	0.0170	0.0174	26.3	41.4
7	204+850 LHS fastlane	13/2/2018	1	0.1636	0.1196	0.0732	0.0508	0.0324	0.0223	0.0126	26.2	41.4
7	204+850 LHS fastlane	13/2/2018	2	0.1615	0.1143	0.0745	0.0487	0.0365	0.0233	0.0267	26.2	41.4
7	204+850 LHS fastlane	13/2/2018	3	0.1608	0.1170	0.0716	0.0496	0.0341	0.0259	0.0200	26.2	41.4
7	205+350 LHS fastlane	13/2/2018	1	0.1229	0.0869	0.0653	0.0404	0.0393	0.0249	0.0170	26.1	41.4
7	205+350 LHS fastlane	13/2/2018	2	0.1209	0.0864	0.0645	0.0385	0.0372	0.0228	0.0219	26.1	41.4
7	205+350 LHS fastlane	13/2/2018	3	0.1184	0.0826	0.0649	0.0393	0.0407	0.0252	0.0177	26.1	41.4
7	205+850 LHS fastlane	13/2/2018	1	0.1650	0.1213	0.0729	0.0463	0.0282	0.0251	0.0186	26.2	41.4
7	205+850 LHS fastlane	13/2/2018	2	0.1647	0.1159	0.0767	0.0427	0.0352	0.0282	0.0163	26.2	41.4
7	205+850 LHS fastlane	13/2/2018	3	0.1603	0.1175	0.0740	0.0455	0.0321	0.0269	0.0159	26.2	41.4
7	206+350 LHS fastlane	13/2/2018	1	0.1339	0.0985	0.0613	0.0463	0.0301	0.0244	0.0209	26.3	41.4

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	206+350 LHS fastlane	13/2/2018	2	0.1321	0.1014	0.0642	0.0416	0.0312	0.0245	0.0228	26.3	41.4
7	206+350 LHS fastlane	13/2/2018	3	0.1331	0.0989	0.0640	0.0439	0.0316	0.0265	0.0220	26.3	41.4
7	206+850 LHS fastlane	13/2/2018	1	0.1168	0.0848	0.0575	0.0443	0.0318	0.0233	0.0221	26.4	38.2
7	206+850 LHS fastlane	13/2/2018	2	0.1133	0.0830	0.0564	0.0423	0.0316	0.0245	0.0205	26.4	38.2
7	206+850 LHS fastlane	13/2/2018	3	0.1141	0.0825	0.0568	0.0424	0.0319	0.0225	0.0218	26.4	38.2
7	207+350 LHS fastlane	14/2/2018	1	0.1074	0.0844	0.0575	0.0397	0.0308	0.0217	0.0194	23.3	22.6
7	207+350 LHS fastlane	14/2/2018	2	0.1060	0.0833	0.0581	0.0377	0.0341	0.0203	0.0177	23.3	22.6
7	207+350 LHS fastlane	14/2/2018	3	0.1049	0.0816	0.0579	0.0414	0.0316	0.0210	0.0186	23.3	22.6
7	207+850 LHS fastlane	14/2/2018	1	0.1427	0.1092	0.0583	0.0453	0.0293	0.0213	0.0190	23.5	22.6
7	207+850 LHS fastlane	14/2/2018	2	0.1442	0.1123	0.0618	0.0461	0.0334	0.0274	0.0207	23.5	22.6
7	207+850 LHS fastlane	14/2/2018	3	0.1450	0.1129	0.0569	0.0441	0.0221	0.0337	0.0200	23.5	22.6
7	208+350 LHS fastlane	14/2/2018	1	0.2233	0.1662	0.0988	0.0472	0.0386	0.0358	0.0355	23.6	22.6
7	208+350 LHS fastlane	14/2/2018	2	0.2213	0.1641	0.1010	0.0418	0.0351	0.0348	0.0360	23.6	22.6
7	208+350 LHS fastlane	14/2/2018	3	0.2189	0.1638	0.1024	0.0445	0.0378	0.0337	0.0376	23.6	22.6
7	208+850 LHS fastlane	14/2/2018	1	0.2398	0.1876	0.1091	0.0662	0.0508	0.0341	0.0234	23.6	22.6
7	208+850 LHS fastlane	14/2/2018	2	0.2376	0.1879	0.1074	0.0696	0.0532	0.0334	0.0235	23.6	22.6
7	208+850 LHS fastlane	14/2/2018	3	0.2353	0.1861	0.1076	0.0685	0.0537	0.0332	0.0231	23.6	22.6
7	209+000 LHS fastlane	14/2/2018	1	0.1791	0.1331	0.0762	0.0512	0.0283	0.0182	0.0187	23.6	22.6
7	209+000 LHS fastlane	14/2/2018	2	0.1776	0.1328	0.0742	0.0511	0.0335	0.0218	0.0217	23.6	22.6
7	209+000 LHS fastlane	14/2/2018	3	0.1711	0.1319	0.0755	0.0509	0.0313	0.0163	0.0200	23.6	22.6
7	209+200 LHS fastlane	14/2/2018	1	0.1655	0.1311	0.0831	0.0555	0.0427	0.0263	0.0229	23.7	22.6
7	209+200 LHS fastlane	14/2/2018	2	0.1640	0.1286	0.0847	0.0555	0.0397	0.0242	0.0244	23.7	22.6
7	209+200 LHS fastlane	14/2/2018	3	0.1661	0.1331	0.0852	0.0569	0.0437	0.0263	0.0234	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	1	0.1465	0.1040	0.0590	0.0558	0.0234	0.0332	0.0182	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	2	0.1433	0.1042	0.0619	0.0572	0.0270	0.0302	0.0217	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	3	0.1445	0.1016	0.0616	0.0479	0.0221	0.0336	0.0195	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	1	0.3479	0.2470	0.0998	0.0539	0.0356	0.0276	0.0251	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	2	0.3535	0.2573	0.1066	0.0567	0.0381	0.0281	0.0250	23.7	22.6
7	209+400 LHS fastlane	14/2/2018	3	0.3426	0.2527	0.1061	0.0563	0.0371	0.0295	0.0266	23.7	22.6
7	209+800 LHS fastlane	14/2/2018	1	0.4606	0.2717	0.1024	0.0517	0.0363	0.0297	0.0273	23.8	22.6
7	209+800 LHS fastlane	14/2/2018	2	0.4517	0.2761	0.1017	0.0578	0.0378	0.0311	0.0310	23.8	22.6
7	209+800 LHS fastlane	14/2/2018	3	0.4516	0.2745	0.1044	0.0540	0.0359	0.0304	0.0328	23.8	22.6
7	210+000 LHS fastlane	14/2/2018	1	0.1227	0.0925	0.0639	0.0410	0.0301	0.0239	0.0220	23.9	22.6
7	210+000 LHS fastlane	14/2/2018	2	0.1259	0.0956	0.0642	0.0421	0.0313	0.0227	0.0236	23.9	22.6
7	210+000 LHS fastlane	14/2/2018	3	0.1227	0.0939	0.0637	0.0436	0.0338	0.0241	0.0227	23.9	22.6
7	210+350 LHS fastlane	14/2/2018	1	0.1392	0.1002	0.0668	0.0513	0.0412	0.0295	0.0247	23.9	22.6
7	210+350 LHS fastlane	14/2/2018	2	0.1393	0.1017	0.0694	0.0522	0.0419	0.0303	0.0249	23.9	22.6
7	210+350 LHS fastlane	14/2/2018	3	0.1376	0.1005	0.0669	0.0516	0.0414	0.0308	0.0247	23.9	22.6
7	210+850 LHS fastlane	14/2/2018	1	0.1701	0.1264	0.0724	0.0486	0.0269	0.0173	0.0178	23.9	22.6
7	210+850 LHS fastlane	14/2/2018	2	0.1687	0.1262	0.0705	0.0485	0.0318	0.0207	0.0206	23.9	22.6
7	210+850 LHS fastlane	14/2/2018	3	0.1625	0.1253	0.0717	0.0484	0.0297	0.0155	0.0190	23.8	22.6
7	210+950 RHS slowlane	14/2/2018	1	0.1572	0.1245	0.0789	0.0527	0.0406	0.0250	0.0218	23.8	22.6
7	210+950 RHS slowlane	14/2/2018	2	0.1558	0.1222	0.0805	0.0527	0.0377	0.0230	0.0232	23.9	22.6
7	210+950 RHS slowlane	14/2/2018	3	0.1578	0.1264	0.0809	0.0541	0.0415	0.0250	0.0222	23.9	22.6
7	210+700 RHS slowlane	14/2/2018	1	0.1575	0.1230	0.0781	0.0559	0.0441	0.0336	0.0271	24.0	22.6
7	210+700 RHS slowlane	14/2/2018	2	0.1563	0.1255	0.0796	0.0590	0.0457	0.0358	0.0270	23.9	22.6
7	210+700 RHS slowlane	14/2/2018	3	0.1564	0.1242	0.0810	0.0584	0.0465	0.0350	0.0275	23.9	22.6
7	210+500 RHS slowlane	14/2/2018	1	0.1055	0.0836	0.0523	0.0382	0.0283	0.0169	0.0137	24.0	22.6
7	210+500 RHS slowlane	14/2/2018	2	0.1032	0.0812	0.0540	0.0388	0.0288	0.0189	0.0143	24.0	22.6
7	210+500 RHS slowlane	14/2/2018	3	0.0985	0.0789	0.0529	0.0388	0.0285	0.0189	0.0147	24.0	22.6
7	210+000 RHS slowlane	14/2/2018	1	0.1296	0.1014	0.0696	0.0452	0.0369	0.0239	0.0172	24.0	22.6
7	210+000 RHS slowlane	14/2/2018	2	0.1279	0.1007	0.0702	0.0469	0.0371	0.0208	0.0183	24.0	22.6
7	210+000 RHS slowlane	14/2/2018	3	0.1264	0.1001	0.0687	0.0457	0.0390	0.0255	0.0177	24.0	22.6
7	209+750 RHS slowlane	14/2/2018	1	0.2650	0.2049	0.1022	0.0518	0.0343	0.0225	0.0213	24.0	22.6
7	209+750 RHS slowlane	14/2/2018	2	0.2548	0.1973	0.0958	0.0449	0.0331	0.0202	0.0216	24.0	22.6
7	209+750 RHS slowlane	14/2/2018	3	0.2528	0.1989	0.0966	0.0482	0.0326	0.0214	0.0208	24.0	22.6
7	209+500 RHS slowlane	14/2/2018	1	0.2026	0.1493	0.0680	0.0348	0.0153	0.0141	0.0176	24.0	22.6
7	209+500 RHS slowlane	14/2/2018	2	0.1992	0.1494	0.0667	0.0374	0.0162	0.0193	0.0176	24.0	22.6
7	209+500 RHS slowlane	14/2/2018	3	0.1930	0.1462	0.0625	0.0324	0.0053	0.0148	0.0166	24.0	22.6
7	209+250 RHS slowlane	14/2/2018	1	0.1404	0.1100	0.0617	0.0377	0.0295	0.0241	0.0188	24.0	22.6
7	209+250 RHS slowlane	14/2/2018	2	0.1380	0.1065	0.0627	0.0396	0.0294	0.0257	0.0173	24.1	22.6
7	209+250 RHS slowlane	14/2/2018	3	0.1207	0.0999	0.0616	0.0395	0.0242	0.0246	0.0146	24.0	22.6
7	209+000 RHS slowlane	14/2/2018	1	0.1162	0.0857	0.0525	0.0386	0.0290	0.0208	0.0163	24.0	22.6
7	209+000 RHS slowlane	14/2/2018	2	0.1140	0.0832	0.0537	0.0386	0.0293	0.0213	0.0156	24.1	22.6
7	209+000 RHS slowlane	14/2/2018	3	0.1137	0.0833	0.0532	0.0397	0.0304	0.0212	0.0163	24.1	22.6
7	208+750 RHS slowlane	14/2/2018	1	0.1954	0.1502	0.0872	0.0598	0.0420	0.0259	0.0236	24.1	22.6
7	208+750 RHS slowlane	14/2/2018	2	0.1906	0.1482	0.0869	0.0605	0.0414	0.0285	0.0239	24.1	22.6
7	208+750 RHS slowlane	14/2/2018	3	0.1921	0.1497	0.0899	0.0611	0.0427	0.0297	0.0238	24.1	22.6
7	208+500 RHS slowlane	14/2/2018	1	0.1918	0.1526	0.0931	0.0600	0.0411	0.0259	0.0179	24.2	22.6
7	208+500 RHS slowlane	14/2/2018	2	0.1970	0.1538	0.0931	0.0608	0.0403	0.0264	0.0183	24.1	22.6
7	208+500 RHS slowlane	14/2/2018	3	0.1951	0.1534	0.0915	0.0607	0.0398	0.0262	0.0196	24.1	22.6
7	208+250 RHS slowlane	14/2/2018	1	0.1953	0.1465	0.0848	0.0555	0.0330	0.0168	0.0145	24.1	22.6
7	208+250 RHS slowlane	14/2/2018	2	0.1909	0.1409	0.0833	0.0544	0.0358	0.0233	0.0207	24.1	22.6
7	208+250 RHS slowlane	14/2/2018	3	0.1834	0.1379	0.0806	0.0507	0.0343	0.0213	0.0179	24.1	22.6
7	208+000 RHS slowlane	14/2/2018	1	0.1272	0.1002	0.0609	0.0391	0.0355	0.0190	0.0195	24.2	22.6
7	208+000 RHS slowlane	14/2/2018	2	0.1280	0.1000	0.0640	0.0434	0.0337	0.0222	0.0186	24.2	22.6

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	208+000 RHS slowlane	14/2/2018	3	0.1239	0.1000	0.0635	0.0413	0.0370	0.0209	0.0190	24.2	22.6
7	207+750 RHS slowlane	14/2/2018	1	0.1508	0.1138	0.0787	0.0464	0.0318	0.0164	0.0213	24.2	22.6
7	207+750 RHS slowlane	14/2/2018	2	0.1486	0.1176	0.0780	0.0349	0.0234	0.0337	0.0140	24.2	22.6
7	207+750 RHS slowlane	14/2/2018	3	0.1482	0.1140	0.0771	0.0380	0.0294	0.0210	0.0149	24.1	22.6
7	207+500 RHS slowlane	14/2/2018	1	0.1238	0.1010	0.0692	0.0506	0.0385	0.0250	0.0191	24.2	22.6
7	207+500 RHS slowlane	14/2/2018	2	0.1222	0.1025	0.0706	0.0542	0.0387	0.0279	0.0225	24.2	22.6
7	207+500 RHS slowlane	14/2/2018	3	0.1212	0.0984	0.0675	0.0505	0.0392	0.0264	0.0183	24.2	22.6
7	207+250 RHS slowlane	14/2/2018	1	0.1066	0.0859	0.0700	0.0382	0.0397	0.0213	0.0283	24.2	22.6
7	207+250 RHS slowlane	14/2/2018	2	0.1080	0.0778	0.0705	0.0377	0.0302	0.0187	0.0250	24.2	22.6
7	207+250 RHS slowlane	14/2/2018	3	0.1064	0.0765	0.0697	0.0333	0.0283	0.0161	0.0404	24.2	22.6
7	207+000 RHS slowlane	14/2/2018	1	0.1165	0.1028	0.0661	0.0456	0.0347	0.0281	0.0177	24.2	22.6
7	207+000 RHS slowlane	14/2/2018	2	0.1085	0.1007	0.0684	0.0424	0.0336	0.0319	0.0147	24.2	22.6
7	207+000 RHS slowlane	14/2/2018	3	0.1107	0.1011	0.0721	0.0427	0.0333	0.0356	0.0158	24.2	22.6
7	206+750 RHS slowlane	14/2/2018	1	0.1037	0.0518	0.0562	0.0391	0.0225	0.0220	0.0027	24.2	22.6
7	206+750 RHS slowlane	14/2/2018	2	0.1038	0.0679	0.0549	0.0372	0.0264	0.0128	0.0146	24.2	22.6
7	206+750 RHS slowlane	14/2/2018	3	0.1022	0.0672	0.0549	0.0371	0.0246	0.0137	0.0068	24.2	22.6
7	206+500 RHS slowlane	14/2/2018	1	0.1212	0.0922	0.0568	0.0396	0.0245	0.0160	0.0205	24.2	27.7
7	206+500 RHS slowlane	14/2/2018	2	0.1186	0.0914	0.0564	0.0419	0.0328	0.0198	0.0192	24.2	27.7
7	206+500 RHS slowlane	14/2/2018	3	0.1162	0.0904	0.0573	0.0406	0.0258	0.0189	0.0178	24.2	27.7
7	206+250 RHS slowlane	14/2/2018	1	0.0989	0.0757	0.0456	0.0349	0.0229	0.0209	0.0161	24.3	27.7
7	206+250 RHS slowlane	14/2/2018	2	0.1024	0.0786	0.0475	0.0370	0.0245	0.0208	0.0174	24.2	27.7
7	206+250 RHS slowlane	14/2/2018	3	0.1007	0.0747	0.0475	0.0367	0.0254	0.0195	0.0158	24.3	27.7
7	206+000 RHS slowlane	14/2/2018	1	0.1355	0.0961	0.0595	0.0379	0.0255	0.0204	0.0162	24.3	27.7
7	206+000 RHS slowlane	14/2/2018	2	0.1296	0.0938	0.0596	0.0359	0.0255	0.0210	0.0152	24.3	27.7
7	206+000 RHS slowlane	14/2/2018	3	0.1307	0.0919	0.0605	0.0352	0.0223	0.0195	0.0167	24.3	27.7
7	205+750 RHS slowlane	14/2/2018	1	0.2223	0.1628	0.0892	0.0581	0.0456	0.0308	0.0252	24.2	27.7
7	205+750 RHS slowlane	14/2/2018	2	0.2107	0.1535	0.0917	0.0600	0.0399	0.0315	0.0235	24.3	27.7
7	205+750 RHS slowlane	14/2/2018	3	0.2125	0.1595	0.0915	0.0614	0.0463	0.0335	0.0273	24.3	27.7
7	205+500 RHS slowlane	14/2/2018	1	0.2176	0.1511	0.0842	0.0547	0.0414	0.0303	0.0280	24.2	27.7
7	205+500 RHS slowlane	14/2/2018	2	0.2130	0.1521	0.0859	0.0579	0.0418	0.0330	0.0292	24.3	27.7
7	205+500 RHS slowlane	14/2/2018	3	0.2127	0.1507	0.0857	0.0546	0.0418	0.0301	0.0296	24.3	27.7
7	205+250 RHS slowlane	14/2/2018	1	0.1216	0.0881	0.0544	0.0400	0.0286	0.0223	0.0173	24.2	27.7
7	205+250 RHS slowlane	14/2/2018	2	0.1188	0.0878	0.0548	0.0400	0.0282	0.0223	0.0186	24.2	27.7
7	205+250 RHS slowlane	14/2/2018	3	0.1168	0.0867	0.0548	0.0406	0.0318	0.0238	0.0196	24.2	27.7
7	205+000 RHS slowlane	14/2/2018	1	0.1401	0.1003	0.0625	0.0433	0.0342	0.0251	0.0282	24.2	27.7
7	205+000 RHS slowlane	14/2/2018	2	0.1425	0.1015	0.0635	0.0445	0.0346	0.0265	0.0249	24.2	27.7
7	205+000 RHS slowlane	14/2/2018	3	0.1400	0.0987	0.0629	0.0453	0.0341	0.0290	0.0245	24.2	27.7
7	204+750 RHS slowlane	14/2/2018	1	0.0809	0.0528	0.0344	0.0257	0.0230	0.0163	0.0158	24.2	27.7
7	204+750 RHS slowlane	14/2/2018	2	0.0796	0.0520	0.0335	0.0253	0.0222	0.0180	0.0169	24.1	27.7
7	204+750 RHS slowlane	14/2/2018	3	0.0768	0.0507	0.0326	0.0266	0.0229	0.0183	0.0153	24.1	27.7
7	204+500 RHS slowlane	14/2/2018	1	0.1645	0.1326	0.0856	0.0637	0.0510	0.0339	0.0257	24.2	27.7
7	204+500 RHS slowlane	14/2/2018	2	0.1604	0.1261	0.0855	0.0637	0.0498	0.0346	0.0287	24.2	27.7
7	204+500 RHS slowlane	14/2/2018	3	0.1660	0.1301	0.0878	0.0653	0.0502	0.0374	0.0306	24.2	27.7
7	204+250 RHS slowlane	14/2/2018	1	0.1815	0.1310	0.0749	0.0463	0.0357	0.0232	0.0201	24.3	27.7
7	204+250 RHS slowlane	14/2/2018	2	0.1777	0.1296	0.0762	0.0485	0.0350	0.0258	0.0195	24.3	27.7
7	204+250 RHS slowlane	14/2/2018	3	0.1768	0.1302	0.0781	0.0514	0.0363	0.0269	0.0208	24.3	27.7
7	204+000 RHS slowlane	14/2/2018	1	0.1589	0.1093	0.0576	0.0357	0.0295	0.0177	0.0177	24.3	27.7
7	204+000 RHS slowlane	14/2/2018	2	0.1645	0.1085	0.0597	0.0369	0.0253	0.0156	0.0068	24.3	27.7
7	204+000 RHS slowlane	14/2/2018	3	0.1595	0.1087	0.0588	0.0367	0.0266	0.0176	0.0152	24.3	27.7
7	203+000 RHS slowlane	14/2/2018	1	0.2020	0.1383	0.0771	0.0494	0.0391	0.0231	0.0183	24.5	27.7
7	203+000 RHS slowlane	14/2/2018	2	0.1953	0.1356	0.0760	0.0477	0.0366	0.0267	0.0170	24.6	27.7
7	203+000 RHS slowlane	14/2/2018	3	0.1925	0.1356	0.0785	0.0496	0.0388	0.0247	0.0206	24.6	27.7
7	202+750 RHS slowlane	14/2/2018	1	0.2433	0.1731	0.0964	0.0624	0.0421	0.0342	0.0233	24.6	27.7
7	202+750 RHS slowlane	14/2/2018	2	0.2415	0.1748	0.0973	0.0594	0.0441	0.0334	0.0282	24.6	27.7
7	202+750 RHS slowlane	14/2/2018	3	0.2358	0.1714	0.0960	0.0602	0.0435	0.0366	0.0268	24.6	27.7
7	202+500 RHS slowlane	14/2/2018	1	0.1519	0.1282	0.0779	0.0535	0.0379	0.0270	0.0217	24.7	27.7
7	202+500 RHS slowlane	14/2/2018	2	0.1507	0.1254	0.0777	0.0517	0.0382	0.0259	0.0224	24.7	27.7
7	202+500 RHS slowlane	14/2/2018	3	0.1511	0.1248	0.0772	0.0534	0.0383	0.0272	0.0219	24.7	27.7
7	202+250 RHS slowlane	14/2/2018	1	0.1361	0.1082	0.0702	0.0498	0.0356	0.0260	0.0201	24.7	27.7
7	202+250 RHS slowlane	14/2/2018	2	0.1319	0.1053	0.0698	0.0479	0.0345	0.0247	0.0189	24.7	27.7
7	202+250 RHS slowlane	14/2/2018	3	0.1330	0.1073	0.0691	0.0506	0.0350	0.0252	0.0189	24.7	27.7
7	202+000 RHS slowlane	14/2/2018	1	0.1261	0.0962	0.0634	0.0457	0.0331	0.0247	0.0190	24.8	27.7
7	202+000 RHS slowlane	14/2/2018	2	0.1231	0.0926	0.0624	0.0441	0.0330	0.0242	0.0181	24.8	27.7
7	202+000 RHS slowlane	14/2/2018	3	0.1206	0.0946	0.0626	0.0450	0.0321	0.0233	0.0184	24.8	27.7
7	201+750 RHS slowlane	14/2/2018	1	0.1320	0.1056	0.0662	0.0456	0.0347	0.0240	0.0195	24.8	27.7
7	201+750 RHS slowlane	14/2/2018	2	0.1288	0.1029	0.0671	0.0445	0.0347	0.0210	0.0194	24.7	27.7
7	201+750 RHS slowlane	14/2/2018	3	0.1283	0.1011	0.0651	0.0460	0.0321	0.0241	0.0199	24.8	27.7
7	201+500 RHS slowlane	14/2/2018	1	0.1047	0.0761	0.0461	0.0317	0.0255	0.0191	0.0170	24.7	27.7
7	201+500 RHS slowlane	14/2/2018	2	0.1050	0.0752	0.0465	0.0324	0.0239	0.0190	0.0174	24.7	27.7
7	201+500 RHS slowlane	14/2/2018	3	0.1011	0.0737	0.0464	0.0310	0.0264	0.0205	0.0162	24.7	27.7
7	201+250 RHS slowlane	14/2/2018	1	0.1021	0.0791	0.0544	0.0391	0.0319	0.0250	0.0200	24.6	27.7
7	201+250 RHS slowlane	14/2/2018	2	0.0983	0.0794	0.0549	0.0406	0.0323	0.0238	0.0204	24.6	27.7
7	201+250 RHS slowlane	14/2/2018	3	0.0997	0.0819	0.0550	0.0429	0.0320	0.0249	0.0208	24.6	27.7
7	201+000 RHS slowlane	14/2/2018	1	0.1109	0.0856	0.0591	0.0385	0.0305	0.0216	0.0000	24.7	27.7
7	201+000 RHS slowlane	14/2/2018	2	0.1135	0.0864	0.0600	0.0399	0.0330	0.0215	0.0058	24.7	27.7
7	201+000 RHS slowlane	14/2/2018	3	0.1070	0.0811	0.0589	0.0417	0.0316	0.0212	0.0167	24.7	27.7

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	200+750 RHS slowlane	14/2/2018	1	0.1393	0.1093	0.0700	0.0479	0.0342	0.0246	0.0184	24.7	27.7
7	200+750 RHS slowlane	14/2/2018	2	0.1361	0.1077	0.0693	0.0478	0.0339	0.0249	0.0207	24.7	27.7
7	200+750 RHS slowlane	14/2/2018	3	0.1345	0.1063	0.0680	0.0477	0.0341	0.0255	0.0196	24.7	27.7
7	200+500 RHS slowlane	14/2/2018	1	0.1218	0.0968	0.0626	0.0420	0.0299	0.0205	0.0150	24.7	27.7
7	200+500 RHS slowlane	14/2/2018	2	0.1217	0.0962	0.0621	0.0432	0.0299	0.0211	0.0147	24.7	27.7
7	200+500 RHS slowlane	14/2/2018	3	0.1192	0.0941	0.0620	0.0427	0.0299	0.0197	0.0146	24.7	27.7
7	200+250 RHS slowlane	14/2/2018	1	0.1183	0.0948	0.0617	0.0450	0.0344	0.0251	0.0199	24.7	27.7
7	200+250 RHS slowlane	14/2/2018	2	0.1149	0.0859	0.0581	0.0375	0.0128	0.0237	0.0204	24.8	27.7
7	200+250 RHS slowlane	14/2/2018	3	0.1152	0.0936	0.0589	0.0403	0.0366	0.0246	0.0234	24.8	27.7
7	200+000 RHS slowlane	14/2/2018	1	0.1548	0.1100	0.0579	0.0299	0.0285	0.0175	0.0176	24.8	27.7
7	200+000 RHS slowlane	14/2/2018	2	0.1507	0.1078	0.0574	0.0274	0.0287	0.0166	0.0167	24.8	27.7
7	200+000 RHS slowlane	14/2/2018	3	0.1529	0.1050	0.0556	0.0253	0.0289	0.0122	0.0131	24.8	27.7
7	199+750 RHS slowlane	14/2/2018	1	0.1276	0.0993	0.0561	0.0446	0.0318	0.0232	0.0233	24.8	27.7
7	199+750 RHS slowlane	14/2/2018	2	0.1253	0.0975	0.0574	0.0443	0.0340	0.0264	0.0218	24.8	27.7
7	199+750 RHS slowlane	14/2/2018	3	0.1244	0.0972	0.0549	0.0445	0.0320	0.0246	0.0269	24.8	27.7
7	199+500 RHS slowlane	14/2/2018	1	0.1167	0.0921	0.0515	0.0389	0.0244	0.0155	0.0194	24.7	27.7
7	199+500 RHS slowlane	14/2/2018	2	0.1091	0.0876	0.0506	0.0349	0.0271	0.0186	0.0144	24.8	27.7
7	199+500 RHS slowlane	14/2/2018	3	0.1116	0.0869	0.0490	0.0334	0.0264	0.0179	0.0134	24.8	27.7
7	199+250 RHS slowlane	14/2/2018	1	0.1818	0.1393	0.0822	0.0530	0.0392	0.0243	0.0224	24.8	27.7
7	199+250 RHS slowlane	14/2/2018	2	0.1787	0.1331	0.0860	0.0450	0.0402	0.0143	0.0184	24.8	27.7
7	199+250 RHS slowlane	14/2/2018	3	0.1744	0.1318	0.0822	0.0465	0.0409	0.0216	0.0189	24.8	27.7
7	199+000 RHS slowlane	14/2/2018	1	0.1299	0.1004	0.0686	0.0460	0.0318	0.0139	0.0212	24.9	27.7
7	199+000 RHS slowlane	14/2/2018	2	0.1321	0.1019	0.0728	0.0475	0.0367	0.0183	0.0202	24.8	27.7
7	199+000 RHS slowlane	14/2/2018	3	0.1295	0.1006	0.0702	0.0467	0.0353	0.0186	0.0212	24.8	27.7
7	198+750 RHS slowlane	14/2/2018	1	0.1537	0.1297	0.0747	0.0532	0.0417	0.0228	0.0255	24.8	27.7
7	198+750 RHS slowlane	14/2/2018	2	0.1485	0.1269	0.0729	0.0490	0.0406	0.0199	0.0234	24.8	27.7
7	198+750 RHS slowlane	14/2/2018	3	0.1468	0.1251	0.0695	0.0465	0.0458	0.0229	0.0257	24.8	27.7
7	198+500 RHS slowlane	14/2/2018	1	0.1124	0.0861	0.0538	0.0378	0.0286	0.0194	0.0181	24.9	27.7
7	198+500 RHS slowlane	14/2/2018	2	0.1140	0.0847	0.0546	0.0341	0.0283	0.0182	0.0178	24.9	27.7
7	198+500 RHS slowlane	14/2/2018	3	0.1105	0.0851	0.0536	0.0377	0.0287	0.0198	0.0180	24.9	27.7
7	198+250 RHS slowlane	14/2/2018	1	0.1242	0.1084	0.0705	0.0298	0.0186	0.0117	0.0048	24.9	32.3
7	198+250 RHS slowlane	14/2/2018	2	0.1211	0.1045	0.0691	0.0354	0.0239	0.0019	0.0165	24.9	32.3
7	198+250 RHS slowlane	14/2/2018	3	0.1185	0.1072	0.0680	0.0329	0.0197	0.0141	0.0143	24.9	32.3
7	198+000 RHS slowlane	14/2/2018	1	0.1986	0.1506	0.0949	0.0538	0.0619	0.0365	0.0179	25.0	32.3
7	198+000 RHS slowlane	14/2/2018	2	0.1950	0.1488	0.0947	0.0567	0.0634	0.0356	0.0199	25.0	32.3
7	198+000 RHS slowlane	14/2/2018	3	0.1905	0.1496	0.0943	0.0553	0.0994	0.0419	0.0151	25.0	32.3
7	197+750 RHS slowlane	14/2/2018	1	0.2102	0.1566	0.0900	0.0505	0.0369	0.0347	0.0193	25.0	32.3
7	197+750 RHS slowlane	14/2/2018	2	0.2133	0.1604	0.0921	0.0538	0.0402	0.0355	0.0243	25.1	32.3
7	197+750 RHS slowlane	14/2/2018	3	0.2063	0.1582	0.0930	0.0523	0.0377	0.0351	0.0263	25.1	32.3
7	197+500 RHS slowlane	14/2/2018	1	0.1939	0.1413	0.0828	0.0551	0.0359	0.0281	0.0233	25.1	32.3
7	197+500 RHS slowlane	14/2/2018	2	0.1874	0.1427	0.0854	0.0571	0.0397	0.0256	0.0239	25.1	32.3
7	197+500 RHS slowlane	14/2/2018	3	0.1855	0.1402	0.0855	0.0599	0.0403	0.0268	0.0205	25.1	32.3
7	197+250 RHS slowlane	14/2/2018	1	0.1949	0.1432	0.0799	0.0560	0.0402	0.0300	0.0250	25.2	32.3
7	197+250 RHS slowlane	14/2/2018	2	0.1921	0.1408	0.0852	0.0559	0.0402	0.0303	0.0248	25.2	32.3
7	197+250 RHS slowlane	14/2/2018	3	0.1904	0.1402	0.0834	0.0569	0.0406	0.0306	0.0251	25.1	32.3
7	197+000 RHS slowlane	14/2/2018	1	0.1437	0.1039	0.0628	0.0431	0.0316	0.0220	0.0167	25.3	32.3
7	197+000 RHS slowlane	14/2/2018	2	0.1383	0.0972	0.0618	0.0434	0.0298	0.0225	0.0171	25.2	32.3
7	197+000 RHS slowlane	14/2/2018	3	0.1364	0.0993	0.0622	0.0424	0.0315	0.0227	0.0193	25.2	32.3
7	196+750 RHS slowlane	14/2/2018	1	0.0899	0.0653	0.0496	0.0367	0.0257	0.0205	0.0130	25.0	32.3
7	196+750 RHS slowlane	14/2/2018	2	0.0855	0.0660	0.0477	0.0335	0.0269	0.0197	0.0052	25.0	32.3
7	196+750 RHS slowlane	14/2/2018	3	0.0832	0.0611	0.0468	0.0340	0.0259	0.0193	0.0056	25.1	32.3
7	196+500 RHS slowlane	14/2/2018	1	0.1400	0.0977	0.0587	0.0320	0.0257	0.0146	0.0132	25.1	32.3
7	196+500 RHS slowlane	14/2/2018	2	0.1410	0.0974	0.0585	0.0362	0.0261	0.0166	0.0149	25.2	32.3
7	196+500 RHS slowlane	14/2/2018	3	0.1363	0.0969	0.0562	0.0375	0.0233	0.0169	0.0119	25.2	32.3
7	196+250 RHS slowlane	14/2/2018	1	0.2211	0.1540	0.0800	0.0513	0.0357	0.0319	0.0243	25.3	32.3
7	196+250 RHS slowlane	14/2/2018	2	0.2201	0.1481	0.0799	0.0534	0.0404	0.0280	0.0220	25.2	32.3
7	196+250 RHS slowlane	14/2/2018	3	0.2189	0.1468	0.0822	0.0543	0.0411	0.0281	0.0254	25.2	32.3
7	196+000 RHS slowlane	14/2/2018	1	0.2404	0.1630	0.0977	0.0653	0.0493	0.0356	0.0299	25.4	32.3
7	196+000 RHS slowlane	14/2/2018	2	0.2365	0.1616	0.0980	0.0635	0.0490	0.0329	0.0268	25.3	32.3
7	196+000 RHS slowlane	14/2/2018	3	0.2322	0.1581	0.0959	0.0616	0.0500	0.0343	0.0271	25.3	32.3
7	195+750 RHS slowlane	14/2/2018	1	0.1489	0.0994	0.0527	0.0351	0.0259	0.0129	0.0006	25.4	32.3
7	195+750 RHS slowlane	14/2/2018	2	0.1450	0.0972	0.0520	0.0341	0.0281	0.0117	0.0058	25.4	32.3
7	195+750 RHS slowlane	14/2/2018	3	0.1456	0.0967	0.0538	0.0355	0.0285	0.0173	0.0086	25.4	32.3
7	195+500 RHS slowlane	14/2/2018	1	0.2520	0.1820	0.0962	0.0622	0.0435	0.0296	0.0196	25.5	32.3
7	195+500 RHS slowlane	14/2/2018	2	0.2514	0.1831	0.0994	0.0658	0.0488	0.0307	0.0259	25.5	32.3
7	195+500 RHS slowlane	14/2/2018	3	0.2498	0.1810	0.0988	0.0594	0.0428	0.0276	0.0258	25.5	32.3
7	195+250 RHS slowlane	14/2/2018	1	0.2090	0.1613	0.0941	0.0587	0.0473	0.0334	0.0258	25.4	32.3
7	195+250 RHS slowlane	14/2/2018	2	0.2078	0.1557	0.0940	0.0582	0.0473	0.0297	0.0304	25.4	32.3
7	195+250 RHS slowlane	14/2/2018	3	0.2011	0.1599	0.0931	0.0557	0.0486	0.0260	0.0259	25.4	32.3
7	195+000 RHS slowlane	14/2/2018	1	0.1528	0.1179	0.0762	0.0493	0.0334	0.0190	0.0178	25.3	32.3
7	195+000 RHS slowlane	14/2/2018	2	0.1534	0.1181	0.0715	0.0458	0.0329	0.0166	0.0182	25.3	32.3
7	195+000 RHS slowlane	14/2/2018	3	0.1496	0.1161	0.0729	0.0510	0.0349	0.0216	0.0198	25.3	32.3
7	194+750 RHS slowlane	14/2/2018	1	0.1573	0.1203	0.0679	0.0446	0.0340	0.0192	0.0170	25.3	32.3
7	194+750 RHS slowlane	14/2/2018	2	0.1556	0.1154	0.0684	0.0434	0.0314	0.0224	0.0178	25.3	32.3
7	194+750 RHS slowlane	14/2/2018	3	0.1551	0.1173	0.0708	0.0446	0.0326	0.0218	0.0186	25.3	32.3
7	194+500 RHS slowlane	14/2/2018	1	0.2081	0.1456	0.0814	0.0533	0.0351	0.0264	0.0237	25.4	32.3

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	194+500 RHS slowlane	14/2/2018	2	0.2036	0.1450	0.0851	0.0527	0.0380	0.0269	0.0236	25.4	32.3
7	194+500 RHS slowlane	14/2/2018	3	0.1979	0.1440	0.0805	0.0538	0.0340	0.0266	0.0236	25.4	32.3
7	194+250 RHS slowlane	14/2/2018	1	0.1661	0.1312	0.0752	0.0456	0.0358	0.0210	0.0190	25.4	32.3
7	194+250 RHS slowlane	14/2/2018	2	0.1601	0.1270	0.0731	0.0476	0.0347	0.0234	0.0199	25.4	32.3
7	194+250 RHS slowlane	14/2/2018	3	0.1630	0.1298	0.0773	0.0459	0.0344	0.0189	0.0217	25.4	32.3
7	194+000 RHS slowlane	14/2/2018	1	0.1543	0.1129	0.0655	0.0459	0.0335	0.0196	0.0195	25.4	32.3
7	194+000 RHS slowlane	14/2/2018	2	0.1531	0.1125	0.0667	0.0491	0.0316	0.0168	0.0201	25.4	32.3
7	194+000 RHS slowlane	14/2/2018	3	0.1552	0.1131	0.0598	0.0483	0.0332	0.0213	0.0244	25.5	32.3
7	193+750 RHS slowlane	14/2/2018	1	0.1454	0.1069	0.0710	0.0475	0.0346	0.0220	0.0185	25.5	32.3
7	193+750 RHS slowlane	14/2/2018	2	0.1406	0.1052	0.0686	0.0429	0.0346	0.0193	0.0190	25.5	32.3
7	193+750 RHS slowlane	14/2/2018	3	0.1421	0.1096	0.0678	0.0446	0.0336	0.0211	0.0191	25.5	32.3
7	193+500 RHS slowlane	14/2/2018	1	0.1727	0.1248	0.0718	0.0446	0.0320	0.0133	0.0170	25.5	36.9
7	193+500 RHS slowlane	14/2/2018	2	0.1683	0.1245	0.0691	0.0393	0.0336	0.0168	0.0162	25.5	36.9
7	193+500 RHS slowlane	14/2/2018	3	0.1670	0.1225	0.0728	0.0428	0.0330	0.0142	0.0273	25.5	36.9
7	193+250 RHS slowlane	14/2/2018	1	0.1760	0.1318	0.0817	0.0555	0.0339	0.0180	0.0179	25.5	36.9
7	193+250 RHS slowlane	14/2/2018	2	0.1731	0.1293	0.0789	0.0509	0.0345	0.0251	0.0270	25.5	36.9
7	193+250 RHS slowlane	14/2/2018	3	0.1724	0.1287	0.0792	0.0519	0.0325	0.0259	0.0264	25.5	36.9
7	193+000 RHS slowlane	14/2/2018	1	0.1473	0.1168	0.0741	0.0506	0.0346	0.0262	0.0190	25.6	36.9
7	193+000 RHS slowlane	14/2/2018	2	0.1466	0.1164	0.0742	0.0473	0.0339	0.0232	0.0239	25.6	36.9
7	193+000 RHS slowlane	14/2/2018	3	0.1449	0.1159	0.0753	0.0437	0.0321	0.0177	0.0210	25.5	36.9
7	192+750 RHS slowlane	14/2/2018	1	0.1891	0.1521	0.0811	0.0409	0.0318	0.0161	0.0309	25.6	36.9
7	192+750 RHS slowlane	14/2/2018	2	0.1874	0.1516	0.0805	0.0413	0.0346	0.0185	0.0294	25.6	36.9
7	192+750 RHS slowlane	14/2/2018	3	0.1881	0.1516	0.0803	0.0433	0.0313	0.0151	0.0292	25.6	36.9
7	192+500 RHS slowlane	14/2/2018	1	0.1238	0.0924	0.0599	0.0366	0.0250	0.0126	0.0063	25.7	36.9
7	192+500 RHS slowlane	14/2/2018	2	0.1259	0.0911	0.0572	0.0362	0.0245	0.0128	0.0132	25.7	36.9
7	192+500 RHS slowlane	14/2/2018	3	0.1227	0.0889	0.0568	0.0387	0.0245	0.0180	0.0141	25.7	36.9
7	192+250 RHS slowlane	14/2/2018	1	0.1701	0.1213	0.0734	0.0471	0.0298	0.0215	0.0228	25.7	36.9
7	192+250 RHS slowlane	14/2/2018	2	0.1671	0.1189	0.0713	0.0386	0.0337	0.0217	0.0224	25.7	36.9
7	192+250 RHS slowlane	14/2/2018	3	0.1659	0.1220	0.0731	0.0455	0.0298	0.0202	0.0177	25.7	36.9
7	192+000 RHS slowlane	14/2/2018	1	0.1523	0.1017	0.0530	0.0328	0.0259	0.0158	0.0143	25.7	36.9
7	192+000 RHS slowlane	14/2/2018	2	0.1539	0.1015	0.0540	0.0305	0.0244	0.0175	0.0135	25.7	36.9
7	192+000 RHS slowlane	14/2/2018	3	0.1499	0.1036	0.0539	0.0291	0.0276	0.0173	0.0121	25.7	36.9
7	191+750 RHS slowlane	14/2/2018	1	0.1533	0.1089	0.0658	0.0370	0.0315	0.0130	0.0065	25.7	36.9
7	191+750 RHS slowlane	14/2/2018	2	0.1525	0.1101	0.0659	0.0368	0.0238	0.0142	0.0161	25.7	36.9
7	191+750 RHS slowlane	14/2/2018	3	0.1513	0.1139	0.0669	0.0353	0.0335	0.0131	0.0159	25.7	36.9
7	191+500 RHS slowlane	14/2/2018	1	0.2026	0.1536	0.0742	0.0481	0.0449	0.0333	0.0266	25.7	36.9
7	191+500 RHS slowlane	14/2/2018	2	0.2046	0.1483	0.0848	0.0559	0.0414	0.0329	0.0316	25.7	36.9
7	191+500 RHS slowlane	14/2/2018	3	0.2048	0.1538	0.0894	0.0553	0.0434	0.0333	0.0279	25.8	36.9
7	191+250 RHS slowlane	14/2/2018	1	0.0851	0.0460	0.0296	0.0300	0.0160	0.0127	0.0121	25.8	36.9
7	191+250 RHS slowlane	14/2/2018	2	0.0881	0.0555	0.0344	0.0325	0.0211	0.0173	0.0125	25.8	36.9
7	191+250 RHS slowlane	14/2/2018	3	0.0898	0.0536	0.0340	0.0321	0.0195	0.0159	0.0070	25.8	36.9
7	191+000 RHS slowlane	14/2/2018	1	0.2298	0.1694	0.0928	0.0489	0.0255	0.0069	0.0169	25.7	36.9
7	191+000 RHS slowlane	14/2/2018	2	0.2299	0.1670	0.0968	0.0520	0.0345	0.0078	0.0010	25.7	36.9
7	191+000 RHS slowlane	14/2/2018	3	0.2236	0.1604	0.0940	0.0523	0.0304	0.0130	0.0065	25.8	36.9
7	190+750 RHS slowlane	14/2/2018	1	0.1390	0.0966	0.0641	0.0435	0.0295	0.0217	0.0176	25.8	36.9
7	190+750 RHS slowlane	14/2/2018	2	0.1360	0.0966	0.0615	0.0433	0.0303	0.0220	0.0166	25.7	36.9
7	190+750 RHS slowlane	14/2/2018	3	0.1361	0.0952	0.0624	0.0415	0.0310	0.0194	0.0184	25.7	36.9
7	190+500 RHS slowlane	14/2/2018	1	0.2129	0.1450	0.0888	0.0621	0.0515	0.0395	0.0359	25.7	36.9
7	190+500 RHS slowlane	14/2/2018	2	0.2061	0.1409	0.0889	0.0628	0.0532	0.0406	0.0396	25.7	36.9
7	190+500 RHS slowlane	14/2/2018	3	0.2058	0.1424	0.0885	0.0631	0.0519	0.0385	0.0374	25.7	36.9
7	190+250 RHS slowlane	14/2/2018	1	0.1615	0.1156	0.0773	0.0506	0.0314	0.0212	0.0143	25.8	36.9
7	190+250 RHS slowlane	14/2/2018	2	0.1604	0.1174	0.0767	0.0489	0.0339	0.0220	0.0181	25.7	36.9
7	190+250 RHS slowlane	14/2/2018	3	0.1611	0.1191	0.0769	0.0497	0.0338	0.0210	0.0145	25.7	36.9
7	190+000 RHS slowlane	14/2/2018	1	0.1562	0.1251	0.0643	0.0471	0.0299	0.0149	0.0074	25.8	36.9
7	190+000 RHS slowlane	14/2/2018	2	0.1592	0.1272	0.0722	0.0499	0.0337	0.0197	0.0142	25.8	36.9
7	190+000 RHS slowlane	14/2/2018	3	0.1612	0.1251	0.0751	0.0501	0.0342	0.0199	0.0172	25.8	36.9
7	189+750 RHS slowlane	14/2/2018	1	0.1692	0.1311	0.0822	0.0514	0.0380	0.0316	0.0265	25.8	36.9
7	189+750 RHS slowlane	14/2/2018	2	0.1690	0.1336	0.0815	0.0519	0.0401	0.0323	0.0257	25.8	36.9
7	189+750 RHS slowlane	14/2/2018	3	0.1667	0.1330	0.0790	0.0463	0.0400	0.0349	0.0244	25.8	36.9
7	189+500 RHS slowlane	14/2/2018	1	0.1208	0.0918	0.0594	0.0366	0.0272	0.0136	0.0190	25.8	36.9
7	189+500 RHS slowlane	14/2/2018	2	0.1217	0.0984	0.0611	0.0373	0.0257	0.0128	0.0151	25.8	36.9
7	189+500 RHS slowlane	14/2/2018	3	0.1220	0.0921	0.0587	0.0388	0.0269	0.0134	0.0208	25.8	36.9
7	189+250 RHS slowlane	14/2/2018	1	0.1353	0.0998	0.0591	0.0393	0.0241	0.0177	0.0197	25.8	36.9
7	189+250 RHS slowlane	14/2/2018	2	0.1390	0.1004	0.0593	0.0429	0.0269	0.0199	0.0459	25.8	36.9
7	189+250 RHS slowlane	14/2/2018	3	0.1358	0.0974	0.0600	0.0368	0.0232	0.0171	0.0035	25.8	36.9
7	189+000 RHS slowlane	14/2/2018	1	0.2240	0.1542	0.0836	0.0485	0.0426	0.0065	0.0288	25.9	36.9
7	189+000 RHS slowlane	14/2/2018	2	0.2206	0.1511	0.0839	0.0496	0.0445	0.0342	0.0320	25.9	36.9
7	189+000 RHS slowlane	14/2/2018	3	0.2194	0.1486	0.0837	0.0521	0.0411	0.0350	0.0284	25.8	36.9
7	188+750 RHS slowlane	14/2/2018	1	0.1552	0.1334	0.0767	0.0447	0.0392	0.0349	0.0313	25.9	36.9
7	188+750 RHS slowlane	14/2/2018	2	0.1538	0.1270	0.0683	0.0315	0.0388	0.0194	0.0249	25.9	36.9
7	188+750 RHS slowlane	14/2/2018	3	0.1574	0.1385	0.0865	0.0569	0.0408	0.0273	0.0205	25.9	36.9
7	188+500 RHS slowlane	14/2/2018	1	0.1471	0.1141	0.0742	0.0332	0.0328	0.1258	0.0227	25.9	36.9
7	188+500 RHS slowlane	14/2/2018	2	0.1441	0.1036	0.0707	0.0464	0.0352	0.0255	0.0169	25.9	36.9
7	188+500 RHS slowlane	14/2/2018	3	0.1414	0.1079	0.0737	0.0346	0.0361	0.0282	0.0231	25.9	36.9
7	188+250 RHS slowlane	14/2/2018	1	0.1665	0.1293	0.0777	0.0538	0.0443	0.0332	0.0190	25.9	36.9
7	188+250 RHS slowlane	14/2/2018	2	0.1667	0.1291	0.0810	0.0607	0.0502	0.0370	0.0250	25.9	36.9



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	188+250 RHS slowlane	14/2/2018	3	0.1652	0.1262	0.0820	0.0570	0.0457	0.0297	0.0204	25.9	36.9
7	187+750 RHS slowlane	14/2/2018	1	0.2067	0.1502	0.0887	0.0608	0.0411	0.0347	0.0141	26.0	36.9
7	187+750 RHS slowlane	14/2/2018	2	0.2070	0.1529	0.0904	0.0638	0.0445	0.0325	0.0251	26.0	36.9
7	187+750 RHS slowlane	14/2/2018	3	0.2000	0.1454	0.0904	0.0673	0.0427	0.0276	0.0234	26.0	36.9
7	187+500 RHS slowlane	14/2/2018	1	0.2222	0.1654	0.0945	0.0599	0.0410	0.0361	0.0306	26.0	36.9
7	187+500 RHS slowlane	14/2/2018	2	0.2179	0.1755	0.0870	0.0488	0.0416	0.0261	0.0227	26.0	36.9
7	187+500 RHS slowlane	14/2/2018	3	0.2130	0.1667	0.0886	0.0521	0.0406	0.0345	0.0324	26.0	36.9
7	187+250 RHS slowlane	14/2/2018	1	0.2082	0.1526	0.0793	0.0438	0.0353	0.0298	0.0249	26.0	36.9
7	187+250 RHS slowlane	14/2/2018	2	0.2055	0.1584	0.0808	0.0409	0.0388	0.0341	0.0171	26.0	36.9
7	187+250 RHS slowlane	14/2/2018	3	0.2059	0.1560	0.0826	0.0462	0.0415	0.0292	0.0261	26.0	36.9
7	187+000 RHS slowlane	14/2/2018	1	0.1342	0.1018	0.0610	0.0363	0.0181	0.0246	0.0128	26.1	36.9
7	187+000 RHS slowlane	14/2/2018	2	0.1344	0.1012	0.0617	0.0414	0.0307	0.0204	0.0149	26.1	36.9
7	187+000 RHS slowlane	14/2/2018	3	0.1299	0.0985	0.0641	0.0354	0.0407	0.0248	0.0124	26.1	36.9
7	186+750 RHS slowlane	14/2/2018	1	0.1403	0.0985	0.0567	0.0373	0.0248	0.0166	0.0153	26.1	36.9
7	186+750 RHS slowlane	14/2/2018	2	0.1380	0.0979	0.0573	0.0364	0.0265	0.0182	0.0193	26.1	36.9
7	186+750 RHS slowlane	14/2/2018	3	0.1404	0.1010	0.0608	0.0380	0.0286	0.0181	0.0208	26.1	36.9
7	186+500 RHS slowlane	14/2/2018	1	0.1498	0.1044	0.0594	0.0375	0.0287	0.0211	0.0186	26.1	36.9
7	186+500 RHS slowlane	14/2/2018	2	0.1463	0.0984	0.0564	0.0304	0.0264	0.0187	0.0183	26.0	36.9
7	186+500 RHS slowlane	14/2/2018	3	0.1446	0.1026	0.0568	0.0310	0.0317	0.0209	0.0231	26.0	36.9
7	186+250 RHS slowlane	14/2/2018	1	0.1427	0.0983	0.0623	0.0401	0.0321	0.0206	0.0165	26.1	36.9
7	186+250 RHS slowlane	14/2/2018	2	0.1402	0.0975	0.0641	0.0426	0.0333	0.0265	0.0191	26.1	36.9
7	186+250 RHS slowlane	14/2/2018	3	0.1412	0.1005	0.0628	0.0426	0.0337	0.0244	0.0210	26.1	36.9
7	186+000 RHS slowlane	14/2/2018	1	0.1674	0.1055	0.0573	0.0370	0.0256	0.0175	0.0162	26.1	36.9
7	186+000 RHS slowlane	14/2/2018	2	0.1641	0.1074	0.0612	0.0324	0.0256	0.0133	0.0163	26.1	36.9
7	186+000 RHS slowlane	14/2/2018	3	0.1694	0.1085	0.0600	0.0399	0.0244	0.0212	0.0152	26.1	36.9
7	185+750 RHS slowlane	14/2/2018	1	0.1828	0.1331	0.0787	0.0463	0.0221	0.0235	0.0191	26.1	36.9
7	185+750 RHS slowlane	14/2/2018	2	0.1798	0.1307	0.0812	0.0481	0.0276	0.0296	0.0203	26.1	36.9
7	185+750 RHS slowlane	14/2/2018	3	0.1798	0.1323	0.0805	0.0487	0.0325	0.0258	0.0209	26.1	36.9
7	185+500 RHS slowlane	14/2/2018	1	0.1471	0.1063	0.0597	0.0396	0.0272	0.0182	0.0091	26.1	36.9
7	185+500 RHS slowlane	14/2/2018	2	0.1494	0.1046	0.0588	0.0386	0.0266	0.0159	0.0122	26.1	36.9
7	185+500 RHS slowlane	14/2/2018	3	0.1477	0.1019	0.0608	0.0400	0.0257	0.0201	0.0142	26.1	36.9
7	185+250 RHS slowlane	14/2/2018	1	0.1659	0.1258	0.0766	0.0520	0.0389	0.0207	0.0278	26.1	36.9
7	185+250 RHS slowlane	14/2/2018	2	0.1598	0.1268	0.0763	0.0486	0.0388	0.0184	0.0251	26.1	36.9
7	185+250 RHS slowlane	14/2/2018	3	0.1599	0.1194	0.0735	0.0470	0.0319	0.0219	0.0109	26.1	36.9
7	185+000 RHS slowlane	14/2/2018	1	0.1859	0.1262	0.0722	0.0550	0.0456	0.0380	0.0243	26.1	36.9
7	185+000 RHS slowlane	14/2/2018	2	0.1922	0.1311	0.0742	0.0570	0.0485	0.0396	0.0278	26.2	36.9
7	185+000 RHS slowlane	14/2/2018	3	0.1890	0.1288	0.0787	0.0564	0.0462	0.0330	0.0286	26.2	36.9
7	184+750 RHS slowlane	14/2/2018	1	0.1666	0.1224	0.0757	0.0557	0.0444	0.0336	0.0254	26.2	39.7
7	184+750 RHS slowlane	14/2/2018	2	0.1631	0.1218	0.0779	0.0555	0.0440	0.0314	0.0299	26.2	39.7
7	184+750 RHS slowlane	14/2/2018	3	0.1618	0.1219	0.0764	0.0545	0.0461	0.0358	0.0267	26.2	39.7
7	184+500 RHS slowlane	14/2/2018	1	0.1297	0.0969	0.0589	0.0378	0.0358	0.0302	0.0234	26.1	39.7
7	184+500 RHS slowlane	14/2/2018	2	0.1291	0.0945	0.0606	0.0371	0.0365	0.0318	0.0200	26.2	39.7
7	184+500 RHS slowlane	14/2/2018	3	0.1272	0.0956	0.0608	0.0386	0.0346	0.0282	0.0206	26.1	39.7
7	184+250 RHS slowlane	14/2/2018	1	0.1844	0.1388	0.0901	0.0568	0.0504	0.0381	0.0306	26.2	39.7
7	184+250 RHS slowlane	14/2/2018	2	0.1763	0.1371	0.0863	0.0553	0.0508	0.0370	0.0295	26.2	39.7
7	184+250 RHS slowlane	14/2/2018	3	0.1758	0.1346	0.0864	0.0438	0.0471	0.0345	0.0277	26.2	39.7
7	184+000 RHS slowlane	14/2/2018	1	0.2488	0.1794	0.1021	0.0645	0.0507	0.0408	0.0338	26.2	39.7
7	184+000 RHS slowlane	14/2/2018	2	0.2434	0.1733	0.1024	0.0613	0.0509	0.0386	0.0307	26.2	39.7
7	184+000 RHS slowlane	14/2/2018	3	0.2404	0.1760	0.1038	0.0581	0.0505	0.0372	0.0277	26.2	39.7
7	183+750 RHS slowlane	14/2/2018	1	0.2029	0.1454	0.0942	0.0686	0.0542	0.0400	0.0310	26.3	39.7
7	183+750 RHS slowlane	14/2/2018	2	0.2044	0.1466	0.0961	0.0720	0.0557	0.0404	0.0335	26.3	39.7
7	183+750 RHS slowlane	14/2/2018	3	0.2013	0.1473	0.0956	0.0726	0.0569	0.0417	0.0323	26.3	39.7
7	183+500 RHS slowlane	14/2/2018	1	0.2206	0.1494	0.0845	0.0604	0.0467	0.0357	0.0272	26.2	39.7
7	183+500 RHS slowlane	14/2/2018	2	0.2144	0.1470	0.0854	0.0604	0.0480	0.0371	0.0299	26.1	39.7
7	183+500 RHS slowlane	14/2/2018	3	0.2150	0.1476	0.0858	0.0585	0.0483	0.0341	0.0289	26.2	39.7
7	183+250 RHS slowlane	14/2/2018	1	0.1637	0.1204	0.0727	0.0483	0.0451	0.0313	0.0238	26.2	39.7
7	183+250 RHS slowlane	14/2/2018	2	0.1662	0.1226	0.0764	0.0517	0.0439	0.0323	0.0279	26.2	39.7
7	183+250 RHS slowlane	14/2/2018	3	0.1616	0.1218	0.0757	0.0519	0.0433	0.0334	0.0310	26.2	39.7
7	183+000 RHS slowlane	14/2/2018	1	0.2231	0.1578	0.0950	0.0685	0.0540	0.0400	0.0292	26.3	39.7
7	183+000 RHS slowlane	14/2/2018	2	0.2171	0.1560	0.0942	0.0691	0.0546	0.0414	0.0334	26.3	39.7
7	183+000 RHS slowlane	14/2/2018	3	0.2217	0.1559	0.0943	0.0693	0.0547	0.0421	0.0350	26.3	39.7
7	182+750 RHS slowlane	14/2/2018	1	0.1643	0.1146	0.0715	0.0531	0.0404	0.0310	0.0247	26.3	39.7
7	182+750 RHS slowlane	14/2/2018	2	0.1701	0.1184	0.0744	0.0558	0.0417	0.0349	0.0254	26.3	39.7
7	182+750 RHS slowlane	14/2/2018	3	0.1669	0.1174	0.0740	0.0553	0.0425	0.0377	0.0267	26.3	39.7
7	182+500 RHS slowlane	14/2/2018	1	0.1722	0.1235	0.0748	0.0538	0.0394	0.0320	0.0242	26.3	39.7
7	182+500 RHS slowlane	14/2/2018	2	0.1665	0.1239	0.0756	0.0533	0.0409	0.0332	0.0250	26.3	39.7
7	182+500 RHS slowlane	14/2/2018	3	0.1647	0.1253	0.0777	0.0538	0.0407	0.0300	0.0235	26.3	39.7
7	182+250 RHS slowlane	14/2/2018	1	0.2239	0.1593	0.0954	0.0632	0.0471	0.0361	0.0295	26.2	39.7
7	182+250 RHS slowlane	14/2/2018	2	0.2233	0.1617	0.0983	0.0642	0.0494	0.0377	0.0313	26.2	39.7
7	182+250 RHS slowlane	14/2/2018	3	0.2230	0.1612	0.0971	0.0672	0.0491	0.0380	0.0279	26.2	39.7
7	182+000 RHS slowlane	14/2/2018	1	0.2331	0.1629	0.0930	0.0625	0.0446	0.0349	0.0286	26.1	39.7
7	182+000 RHS slowlane	14/2/2018	2	0.2267	0.1618	0.0938	0.0606	0.0453	0.0358	0.0287	26.1	39.7
7	182+000 RHS slowlane	14/2/2018	3	0.2264	0.1616	0.0941	0.0622	0.0452	0.0352	0.0285	26.1	39.7
7	181+750 RHS slowlane	14/2/2018	1	0.2313	0.1515	0.0885	0.0627	0.0487	0.0363	0.0283	26.1	39.7
7	181+750 RHS slowlane	14/2/2018	2	0.2233	0.1538	0.0897	0.0623	0.0446	0.0352	0.0320	26.1	39.7
7	181+750 RHS slowlane	14/2/2018	3	0.2214	0.1538	0.0907	0.0639	0.0481	0.0359	0.0284	26.1	39.7

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	181+500 RHS slowlane	14/2/2018	1	0.1224	0.0842	0.0510	0.0340	0.0225	0.0166	0.0083	26.2	39.7
7	181+500 RHS slowlane	14/2/2018	2	0.1242	0.0850	0.0520	0.0351	0.0244	0.0166	0.0132	26.2	39.7
7	181+500 RHS slowlane	14/2/2018	3	0.1233	0.0865	0.0533	0.0347	0.0237	0.0182	0.0091	26.2	39.7
7	181+250 RHS slowlane	14/2/2018	1	0.2103	0.1489	0.0889	0.0584	0.0424	0.0299	0.0232	26.2	39.7
7	181+250 RHS slowlane	14/2/2018	2	0.2058	0.1467	0.0892	0.0584	0.0434	0.0303	0.0244	26.1	39.7
7	181+250 RHS slowlane	14/2/2018	3	0.2059	0.1476	0.0900	0.0596	0.0442	0.0307	0.0254	26.1	39.7
7	181+000 RHS slowlane	14/2/2018	1	0.2130	0.1542	0.0887	0.0617	0.0485	0.0356	0.0309	26.2	39.7
7	181+000 RHS slowlane	14/2/2018	2	0.2073	0.1490	0.0862	0.0627	0.0511	0.0347	0.0300	26.2	39.7
7	181+000 RHS slowlane	14/2/2018	3	0.2070	0.1545	0.0908	0.0651	0.0511	0.0422	0.0314	26.2	39.7
7	180+750 RHS slowlane	14/2/2018	1	0.2327	0.1538	0.0872	0.0587	0.0467	0.0355	0.0259	26.3	39.7
7	180+750 RHS slowlane	14/2/2018	2	0.2301	0.1542	0.0868	0.0596	0.0429	0.0335	0.0251	26.3	39.7
7	180+750 RHS slowlane	14/2/2018	3	0.2323	0.1549	0.0871	0.0592	0.0445	0.0334	0.0260	26.3	39.7
7	180+500 RHS slowlane	14/2/2018	1	0.1732	0.1272	0.0798	0.0563	0.0452	0.0365	0.0280	26.3	39.7
7	180+500 RHS slowlane	14/2/2018	2	0.1713	0.1256	0.0803	0.0567	0.0451	0.0321	0.0269	26.3	39.7
7	180+500 RHS slowlane	14/2/2018	3	0.1708	0.1281	0.0808	0.0572	0.0447	0.0327	0.0268	26.3	39.7
7	180+250 RHS slowlane	14/2/2018	1	0.1698	0.1285	0.0799	0.0604	0.0465	0.0362	0.0272	26.4	39.7
7	180+250 RHS slowlane	14/2/2018	2	0.1721	0.1271	0.0787	0.0601	0.0493	0.0409	0.0276	26.4	39.7
7	180+250 RHS slowlane	14/2/2018	3	0.1718	0.1286	0.0776	0.0576	0.0502	0.0417	0.0216	26.4	39.7
7	180+000 RHS slowlane	14/2/2018	1	0.1953	0.1460	0.0898	0.0592	0.0411	0.0278	0.0235	26.4	39.7
7	180+000 RHS slowlane	14/2/2018	2	0.1975	0.1478	0.0897	0.0597	0.0440	0.0256	0.0240	26.4	39.7
7	180+000 RHS slowlane	14/2/2018	3	0.1951	0.1483	0.0892	0.0633	0.0423	0.0321	0.0217	26.4	39.7
7	179+750 RHS slowlane	14/2/2018	1	0.1904	0.1257	0.0809	0.0478	0.0388	0.0259	0.0191	26.5	39.7
7	179+750 RHS slowlane	14/2/2018	2	0.1909	0.1300	0.0783	0.0500	0.0384	0.0254	0.0186	26.5	39.7
7	179+750 RHS slowlane	14/2/2018	3	0.1860	0.1255	0.0776	0.0521	0.0384	0.0272	0.0200	26.5	39.7
7	179+500 RHS slowlane	14/2/2018	1	0.1938	0.1315	0.0762	0.0404	0.0502	0.0209	0.0214	26.5	39.7
7	179+500 RHS slowlane	14/2/2018	2	0.1891	0.1313	0.0758	0.0469	0.0374	0.0288	0.0186	26.5	39.7
7	179+500 RHS slowlane	14/2/2018	3	0.1903	0.1321	0.0790	0.0482	0.0349	0.0282	0.0187	26.5	39.7
7	179+250 RHS slowlane	14/2/2018	1	0.1514	0.1059	0.0606	0.0434	0.0283	0.0246	0.0169	26.5	39.7
7	179+250 RHS slowlane	14/2/2018	2	0.1473	0.0996	0.0540	0.0319	0.0244	0.0269	0.0134	26.5	39.7
7	179+250 RHS slowlane	14/2/2018	3	0.1464	0.1055	0.0629	0.0405	0.0318	0.0213	0.0177	26.5	39.7
7	179+000 RHS slowlane	14/2/2018	1	0.2134	0.1511	0.0910	0.0606	0.0427	0.0364	0.0247	26.5	39.7
7	179+000 RHS slowlane	14/2/2018	2	0.2099	0.1500	0.0915	0.0637	0.0372	0.0388	0.0268	26.5	39.7
7	179+000 RHS slowlane	14/2/2018	3	0.2092	0.1506	0.0903	0.0628	0.0483	0.0351	0.0280	26.5	39.7
7	178+750 RHS slowlane	14/2/2018	1	0.1821	0.1286	0.0764	0.0471	0.0339	0.0235	0.0117	26.5	39.7
7	178+750 RHS slowlane	14/2/2018	2	0.1794	0.1238	0.0742	0.0496	0.0301	0.0228	0.0114	26.5	39.7
7	178+750 RHS slowlane	14/2/2018	3	0.1333	0.1059	0.0669	0.0495	0.0329	0.0266	0.0133	26.5	39.7
7	178+500 RHS slowlane	14/2/2018	1	0.1494	0.1253	0.0799	0.0572	0.0389	0.0280	0.0221	26.3	39.7
7	178+500 RHS slowlane	14/2/2018	2	0.1491	0.1244	0.0780	0.0553	0.0437	0.0302	0.0246	26.3	39.7
7	178+500 RHS slowlane	14/2/2018	3	0.1484	0.1272	0.0803	0.0563	0.0423	0.0290	0.0254	26.3	39.7
7	178+250 RHS slowlane	14/2/2018	1	0.1462	0.1021	0.0557	0.0389	0.0254	0.0156	0.0078	26.3	39.7
7	178+250 RHS slowlane	14/2/2018	2	0.1456	0.1011	0.0577	0.0370	0.0275	0.0178	0.0089	26.3	39.7
7	178+250 RHS slowlane	14/2/2018	3	0.1436	0.1016	0.0587	0.0380	0.0274	0.0183	0.0091	26.3	39.7
7	178+000 RHS slowlane	14/2/2018	1	0.1482	0.0994	0.0605	0.0420	0.0302	0.0223	0.0167	26.3	39.7
7	178+000 RHS slowlane	14/2/2018	2	0.1466	0.1043	0.0629	0.0427	0.0278	0.0234	0.0117	26.3	39.7
7	178+000 RHS slowlane	14/2/2018	3	0.1447	0.1021	0.0581	0.0431	0.0336	0.0224	0.0112	26.3	39.7
7	177+500 RHS slowlane	14/2/2018	1	0.1608	0.1239	0.0839	0.0602	0.0466	0.0303	0.0246	26.3	39.7
7	177+750 RHS slowlane	14/2/2018	2	0.1640	0.1213	0.0839	0.0599	0.0493	0.0320	0.0277	26.3	39.7
7	177+750 RHS slowlane	14/2/2018	3	0.1590	0.1191	0.0795	0.0601	0.0422	0.0306	0.0259	26.3	39.7
7	177+500 RHS slowlane	14/2/2018	1	0.1863	0.1381	0.0801	0.0464	0.0277	0.0194	0.0121	26.3	39.7
7	177+500 RHS slowlane	14/2/2018	2	0.1852	0.1414	0.0801	0.0446	0.0264	0.0177	0.0124	26.3	39.7
7	177+500 RHS slowlane	14/2/2018	3	0.1851	0.1385	0.0791	0.0493	0.0285	0.0167	0.0068	26.3	39.7
7	177+250 RHS slowlane	14/2/2018	1	0.1865	0.1468	0.0733	0.0427	0.0492	0.0165	0.0161	26.4	39.7
7	177+250 RHS slowlane	14/2/2018	2	0.1904	0.1472	0.0816	0.0492	0.0447	0.0225	0.0207	26.4	39.7
7	177+250 RHS slowlane	14/2/2018	3	0.1885	0.1490	0.0789	0.0511	0.0520	0.0206	0.0179	26.5	39.7
7	177+000 RHS slowlane	14/2/2018	1	0.1529	0.1143	0.0735	0.0556	0.0385	0.0229	0.0205	26.5	39.7
7	177+000 RHS slowlane	14/2/2018	2	0.1506	0.1137	0.0739	0.0531	0.0341	0.0248	0.0166	26.5	39.7
7	177+000 RHS slowlane	14/2/2018	3	0.1502	0.1098	0.0738	0.0497	0.0344	0.0261	0.0172	26.5	39.7
7	176+750 RHS slowlane	14/2/2018	1	0.1553	0.1170	0.0730	0.0477	0.0344	0.0261	0.0208	26.6	39.7
7	176+750 RHS slowlane	14/2/2018	2	0.1533	0.1132	0.0704	0.0500	0.0361	0.0229	0.0202	26.6	39.7
7	176+750 RHS slowlane	14/2/2018	3	0.1523	0.1170	0.0747	0.0461	0.0311	0.0276	0.0220	26.6	39.7
7	176+500 RHS slowlane	14/2/2018	1	0.1421	0.1013	0.0600	0.0458	0.0352	0.0285	0.0245	26.7	39.7
7	176+500 RHS slowlane	14/2/2018	2	0.1398	0.1007	0.0596	0.0463	0.0314	0.0249	0.0202	26.7	39.7
7	176+500 RHS slowlane	14/2/2018	3	0.1415	0.1002	0.0604	0.0465	0.0339	0.0270	0.0223	26.7	39.7
7	176+250 RHS slowlane	14/2/2018	1	0.2014	0.1472	0.0899	0.0641	0.0454	0.0269	0.0239	26.6	41.8
7	176+250 RHS slowlane	14/2/2018	2	0.1982	0.1428	0.0861	0.0607	0.0433	0.0289	0.0205	26.6	41.8
7	176+250 RHS slowlane	14/2/2018	3	0.1946	0.1445	0.0892	0.0629	0.0441	0.0230	0.0246	26.6	41.8
7	176+000 RHS slowlane	14/2/2018	1	0.1020	0.0708	0.0404	0.0304	0.0227	0.0151	0.0132	26.7	41.8
7	176+000 RHS slowlane	14/2/2018	2	0.1037	0.0715	0.0409	0.0317	0.0236	0.0132	0.0164	26.7	41.8
7	176+000 RHS slowlane	14/2/2018	3	0.1004	0.0709	0.0424	0.0309	0.0226	0.0118	0.0177	26.7	41.8
7	175+750 RHS slowlane	14/2/2018	1	0.0537	0.0361	0.0256	0.0264	0.0199	0.0099	0.0168	26.7	41.8
7	175+750 RHS slowlane	14/2/2018	2	0.0505	0.0368	0.0257	0.0253	0.0199	0.0217	0.0145	26.8	41.8
7	175+750 RHS slowlane	14/2/2018	3	0.0496	0.0329	0.0257	0.0253	0.0219	0.0218	0.0150	26.8	41.8
7	175+500 RHS slowlane	14/2/2018	1	0.1299	0.0958	0.0546	0.0404	0.0318	0.0215	0.0197	26.8	41.8
7	175+500 RHS slowlane	14/2/2018	2	0.1271	0.0936	0.0575	0.0401	0.0406	0.0190	0.0182	26.8	41.8
7	175+500 RHS slowlane	14/2/2018	3	0.1279	0.0915	0.0598	0.0441	0.0374	0.0186	0.0206	26.8	41.8
7	175+250 RHS slowlane	14/2/2018	1	0.1340	0.0880	0.0532	0.0351	0.0278	0.0203	0.0174	26.8	41.8

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	175+250 RHS slowlane	14/2/2018	2	0.1302	0.0881	0.0537	0.0382	0.0269	0.0215	0.0125	26.8	41.8
7	175+250 RHS slowlane	14/2/2018	3	0.1329	0.0894	0.0546	0.0369	0.0260	0.0188	0.0155	26.8	41.8
7	175+000 RHS slowlane	14/2/2018	1	0.1235	0.0897	0.0512	0.0334	0.0255	0.0198	0.0137	26.5	41.8
7	175+000 RHS slowlane	14/2/2018	2	0.1252	0.0954	0.0514	0.0351	0.0276	0.0173	0.0121	26.6	41.8
7	175+000 RHS slowlane	14/2/2018	3	0.1248	0.0919	0.0492	0.0330	0.0203	0.0101	0.0050	26.6	41.8
7	174+750 RHS slowlane	14/2/2018	1	0.1760	0.1207	0.0652	0.0406	0.0264	0.0213	0.0106	26.5	41.8
7	174+750 RHS slowlane	14/2/2018	2	0.1713	0.1214	0.0611	0.0371	0.0251	0.0274	0.0137	26.5	41.8
7	174+750 RHS slowlane	14/2/2018	3	0.1695	0.1189	0.0648	0.0399	0.0280	0.0253	0.0142	26.5	41.8
7	174+500 RHS slowlane	14/2/2018	1	0.1511	0.1075	0.0593	0.0429	0.0257	0.0186	0.0052	26.6	41.8
7	174+500 RHS slowlane	14/2/2018	2	0.1499	0.1081	0.0602	0.0408	0.0276	0.0211	0.0105	26.6	41.8
7	174+500 RHS slowlane	14/2/2018	3	0.1533	0.1081	0.0639	0.0441	0.0289	0.0210	0.0156	26.6	41.8
7	174+250 RHS slowlane	14/2/2018	1	0.1515	0.1035	0.0625	0.0430	0.0278	0.0144	0.0072	26.6	41.8
7	174+250 RHS slowlane	14/2/2018	2	0.1542	0.1037	0.0610	0.0419	0.0286	0.0147	0.0153	26.5	41.8
7	174+250 RHS slowlane	14/2/2018	3	0.1497	0.1024	0.0598	0.0446	0.0277	0.0166	0.0128	26.6	41.8
7	174+000 RHS slowlane	14/2/2018	1	0.0971	0.0704	0.0402	0.0230	0.0115	0.0000	0.0135	26.8	41.8
7	174+000 RHS slowlane	14/2/2018	2	0.0994	0.0726	0.0427	0.0256	0.0155	0.0586	0.0293	26.8	41.8
7	174+000 RHS slowlane	14/2/2018	3	0.1034	0.0707	0.0438	0.0277	0.0155	0.0118	0.0053	26.8	41.8
7	173+750 RHS slowlane	14/2/2018	1	0.1662	0.1283	0.0741	0.0472	0.0365	0.0304	0.0201	26.8	41.8
7	173+750 RHS slowlane	14/2/2018	2	0.1681	0.1272	0.0804	0.0472	0.0306	0.0360	0.0249	26.8	41.8
7	173+750 RHS slowlane	14/2/2018	3	0.1682	0.1233	0.0770	0.0467	0.0377	0.0375	0.0228	26.8	41.8
7	173+500 RHS slowlane	14/2/2018	1	0.1639	0.1143	0.0530	0.0430	0.0249	0.0215	0.0065	26.8	41.8
7	173+500 RHS slowlane	14/2/2018	2	0.1644	0.1076	0.0639	0.0421	0.0291	0.0226	0.0182	26.8	41.8
7	173+500 RHS slowlane	14/2/2018	3	0.1602	0.1108	0.0607	0.0412	0.0263	0.0151	0.0133	26.8	41.8
7	173+250 RHS slowlane	14/2/2018	1	0.1719	0.1133	0.0632	0.0454	0.0323	0.0239	0.0261	26.9	41.8
7	173+250 RHS slowlane	14/2/2018	2	0.1718	0.1300	0.0623	0.0423	0.0309	0.0252	0.0126	27.0	41.8
7	173+250 RHS slowlane	14/2/2018	3	0.1692	0.1073	0.0630	0.0416	0.0371	0.0233	0.0116	27.0	41.8
7	173+000 RHS slowlane	14/2/2018	1	0.1529	0.1091	0.0685	0.0456	0.0331	0.0224	0.0168	26.9	41.8
7	173+000 RHS slowlane	14/2/2018	2	0.1504	0.1129	0.0686	0.0473	0.0398	0.0281	0.0209	27.0	41.8
7	173+000 RHS slowlane	14/2/2018	3	0.1502	0.1117	0.0656	0.0474	0.0355	0.0255	0.0182	27.0	41.8
7	172+750 RHS slowlane	14/2/2018	1	0.1011	0.0719	0.0392	0.0335	0.0179	0.0164	0.0192	26.8	41.8
7	172+750 RHS slowlane	14/2/2018	2	0.1039	0.0740	0.0484	0.0329	0.0227	0.0173	0.0260	26.7	41.8
7	172+750 RHS slowlane	14/2/2018	3	0.1031	0.0700	0.0402	0.0331	0.0228	0.0166	0.0216	26.7	41.8
7	172+500 RHS slowlane	14/2/2018	1	0.0923	0.0702	0.0379	0.0249	0.0236	0.0201	0.0015	26.8	41.8
7	172+500 RHS slowlane	14/2/2018	2	0.0913	0.0703	0.0404	0.0250	0.0146	0.0205	0.0083	26.8	41.8
7	172+500 RHS slowlane	14/2/2018	3	0.0948	0.0712	0.0465	0.0302	0.0191	0.0203	0.0101	26.8	41.8
7	172+250 RHS slowlane	14/2/2018	1	0.1710	0.1280	0.0660	0.0368	0.0294	0.0256	0.0128	26.7	41.8
7	172+250 RHS slowlane	14/2/2018	2	0.1703	0.1245	0.0654	0.0368	0.0279	0.0232	0.0116	26.7	41.8
7	172+250 RHS slowlane	14/2/2018	3	0.1712	0.1236	0.0664	0.0382	0.0295	0.0249	0.0167	26.7	41.8
7	172+000 RHS slowlane	14/2/2018	1	0.1462	0.0973	0.0533	0.0408	0.0206	0.0131	0.0153	26.6	41.8
7	172+000 RHS slowlane	14/2/2018	2	0.1436	0.0966	0.0518	0.0453	0.0226	0.0137	0.0001	26.6	41.8
7	172+000 RHS slowlane	14/2/2018	3	0.1399	0.0958	0.0572	0.0390	0.0198	0.0159	0.0165	26.6	41.8
7	171+750 RHS slowlane	14/2/2018	1	0.1717	0.1125	0.0616	0.0399	0.0223	0.0222	0.0185	26.6	41.8
7	171+750 RHS slowlane	14/2/2018	2	0.1693	0.1114	0.0663	0.0395	0.0174	0.0233	0.0180	26.6	41.8
7	171+750 RHS slowlane	14/2/2018	3	0.1669	0.1135	0.0612	0.0368	0.0186	0.0179	0.0222	26.6	41.8
7	171+500 RHS slowlane	14/2/2018	1	0.2175	0.1582	0.0833	0.0530	0.0394	0.0218	0.0216	26.7	41.8
7	171+500 RHS slowlane	14/2/2018	2	0.2194	0.1569	0.0858	0.0561	0.0425	0.0238	0.0230	26.8	41.8
7	171+500 RHS slowlane	14/2/2018	3	0.2144	0.1532	0.0852	0.0565	0.0422	0.0230	0.0227	26.8	41.8
7	171+250 RHS slowlane	14/2/2018	1	0.1623	0.1048	0.0602	0.0421	0.0312	0.0222	0.0158	26.8	41.8
7	171+250 RHS slowlane	14/2/2018	2	0.1649	0.1045	0.0587	0.0390	0.0293	0.0217	0.0160	26.8	41.8
7	171+250 RHS slowlane	14/2/2018	3	0.1618	0.1022	0.0582	0.0404	0.0342	0.0222	0.0157	26.9	41.8
7	171+000 RHS slowlane	14/2/2018	1	0.1915	0.1436	0.0814	0.0507	0.0358	0.0233	0.0208	26.9	41.8
7	171+000 RHS slowlane	14/2/2018	2	0.1937	0.1406	0.0823	0.0520	0.0357	0.0261	0.0205	26.9	41.8
7	171+000 RHS slowlane	14/2/2018	3	0.1880	0.1434	0.0802	0.0543	0.0338	0.0225	0.0237	26.9	41.8
7	170+750 RHS slowlane	14/2/2018	1	0.1698	0.1134	0.0654	0.0416	0.0300	0.0246	0.0184	27.0	41.8
7	170+750 RHS slowlane	14/2/2018	2	0.1708	0.1148	0.0636	0.0426	0.0329	0.0231	0.0194	27.0	41.8
7	170+750 RHS slowlane	14/2/2018	3	0.1686	0.1088	0.0628	0.0440	0.0308	0.0259	0.0186	27.0	41.8
7	170+500 RHS slowlane	14/2/2018	1	0.1419	0.1005	0.0625	0.0441	0.0327	0.0216	0.0234	26.9	41.8
7	170+500 RHS slowlane	14/2/2018	2	0.1415	0.1004	0.0640	0.0438	0.0303	0.0228	0.0209	27.0	41.8
7	170+500 RHS slowlane	14/2/2018	3	0.1370	0.0974	0.0627	0.0421	0.0331	0.0232	0.0151	27.0	41.8
7	170+250 RHS slowlane	14/2/2018	1	0.1702	0.1128	0.0660	0.0415	0.0304	0.0255	0.0155	27.1	41.8
7	170+250 RHS slowlane	14/2/2018	2	0.1730	0.1166	0.0683	0.0455	0.0313	0.0261	0.0176	27.1	41.8
7	170+250 RHS slowlane	14/2/2018	3	0.1711	0.1167	0.0693	0.0439	0.0332	0.0241	0.0174	27.0	41.8
7	170+000 RHS slowlane	14/2/2018	1	0.1949	0.1440	0.0835	0.0539	0.0350	0.0241	0.0212	27.0	41.8
7	170+000 RHS slowlane	14/2/2018	2	0.1932	0.1413	0.0827	0.0533	0.0428	0.0176	0.0223	27.0	41.8
7	170+000 RHS slowlane	14/2/2018	3	0.1914	0.1445	0.0869	0.0514	0.0376	0.0222	0.0259	27.0	41.8
7	169+750 RHS slowlane	14/2/2018	1	0.1669	0.1217	0.0718	0.0472	0.0333	0.0267	0.0215	27.0	41.8
7	169+750 RHS slowlane	14/2/2018	2	0.1685	0.1247	0.0683	0.0454	0.0363	0.0294	0.0226	27.0	41.8
7	169+750 RHS slowlane	14/2/2018	3	0.1680	0.1203	0.0705	0.0461	0.0342	0.0263	0.0203	27.0	41.8
7	169+500 RHS slowlane	14/2/2018	1	0.1600	0.1185	0.0747	0.0478	0.0377	0.0271	0.0154	26.9	41.8
7	169+500 RHS slowlane	14/2/2018	2	0.1568	0.1164	0.0720	0.0459	0.0403	0.0265	0.0171	27.0	41.8
7	169+500 RHS slowlane	14/2/2018	3	0.1596	0.1208	0.0742	0.0472	0.0372	0.0261	0.0188	27.0	41.8
7	169+250 RHS slowlane	14/2/2018	1	0.1220	0.0879	0.0558	0.0396	0.0298	0.0191	0.0121	27.1	41.8
7	169+250 RHS slowlane	14/2/2018	2	0.1293	0.0934	0.0597	0.0419	0.0303	0.0189	0.0145	27.1	41.8
7	169+250 RHS slowlane	14/2/2018	3	0.1251	0.0927	0.0615	0.0421	0.0309	0.0207	0.0125	27.1	41.8
7	169+000 RHS slowlane	14/2/2018	1	0.1489	0.1111	0.0685	0.0403	0.0337	0.0174	0.0164	27.2	41.8
7	169+000 RHS slowlane	14/2/2018	2	0.1507	0.1131	0.0694	0.0408	0.0328	0.0184	0.0186	27.2	41.8



Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	169+000 RHS slowlane	14/2/2018	3	0.1518	0.1129	0.0695	0.0466	0.0334	0.0170	0.0179	27.2	41.8
7	168+750 RHS slowlane	14/2/2018	1	0.1606	0.0980	0.0601	0.0464	0.0299	0.0196	0.0233	27.1	41.8
7	168+750 RHS slowlane	14/2/2018	2	0.1570	0.1051	0.0628	0.0382	0.0289	0.0217	0.0231	27.1	41.8
7	168+750 RHS slowlane	14/2/2018	3	0.1571	0.1052	0.0626	0.0434	0.0303	0.0226	0.0226	27.0	41.8
7	168+500 RHS slowlane	14/2/2018	1	0.1475	0.0789	0.0403	0.0285	0.0132	0.0055	0.0108	27.1	41.8
7	168+500 RHS slowlane	14/2/2018	2	0.1414	0.0854	0.0378	0.0235	0.0133	0.0071	0.0005	27.1	41.8
7	168+500 RHS slowlane	14/2/2018	3	0.1399	0.0817	0.0399	0.0221	0.0150	0.0219	0.0109	27.1	41.8
7	168+250 RHS slowlane	14/2/2018	1	0.1485	0.1084	0.0716	0.0473	0.0360	0.0259	0.0193	27.1	41.8
7	168+250 RHS slowlane	14/2/2018	2	0.1497	0.1125	0.0717	0.0503	0.0386	0.0234	0.0219	27.1	41.8
7	168+250 RHS slowlane	14/2/2018	3	0.1486	0.1082	0.0724	0.0461	0.0353	0.0228	0.0229	27.1	41.8
7	168+000 RHS slowlane	14/2/2018	1	0.1292	0.0956	0.0615	0.0428	0.0302	0.0222	0.0187	27.1	41.8
7	168+000 RHS slowlane	14/2/2018	2	0.1250	0.0838	0.0629	0.0442	0.0325	0.0267	0.0158	27.2	41.8
7	168+000 RHS slowlane	14/2/2018	3	0.1274	0.0914	0.0656	0.0375	0.0361	0.0245	0.0209	27.1	41.8
7	167+750 RHS slowlane	14/2/2018	1	0.1230	0.0841	0.0486	0.0325	0.0195	0.0136	0.0128	27.1	41.8
7	167+750 RHS slowlane	14/2/2018	2	0.1243	0.0847	0.0523	0.0336	0.0197	0.0151	0.0162	27.1	41.8
7	167+750 RHS slowlane	14/2/2018	3	0.1260	0.0878	0.0503	0.0317	0.0212	0.0193	0.0151	27.1	41.8
7	167+500 RHS slowlane	14/2/2018	1	0.1273	0.0852	0.0475	0.0280	0.0145	0.0125	0.0062	27.2	41.8
7	167+500 RHS slowlane	14/2/2018	2	0.1308	0.0851	0.0465	0.0297	0.0172	0.0114	0.0057	27.2	41.8
7	167+500 RHS slowlane	14/2/2018	3	0.1255	0.0857	0.0470	0.0294	0.0184	0.0121	0.0060	27.1	41.8
7	167+250 RHS slowlane	14/2/2018	1	0.1453	0.0930	0.0537	0.0351	0.0265	0.0162	0.0524	27.2	41.8
7	167+250 RHS slowlane	14/2/2018	2	0.1425	0.0960	0.0563	0.0355	0.0283	0.0171	0.0237	27.2	41.8
7	167+250 RHS slowlane	14/2/2018	3	0.1437	0.0929	0.0531	0.0344	0.0269	0.0180	0.0157	27.2	41.8
7	167+000 RHS slowlane	14/2/2018	1	0.1353	0.0842	0.0483	0.0315	0.0218	0.0168	0.0135	27.2	41.8
7	167+000 RHS slowlane	14/2/2018	2	0.1357	0.0854	0.0537	0.0362	0.0277	0.0185	0.0159	27.2	41.8
7	167+000 RHS slowlane	14/2/2018	3	0.1334	0.0876	0.0505	0.0358	0.0236	0.0167	0.0195	27.2	41.8
7	166+750 RHS slowlane	14/2/2018	1	0.1815	0.1264	0.0757	0.0559	0.0368	0.0327	0.0246	27.1	41.8
7	166+750 RHS slowlane	14/2/2018	2	0.1780	0.1203	0.0774	0.0533	0.0435	0.0331	0.0267	27.2	41.8
7	166+750 RHS slowlane	14/2/2018	3	0.1787	0.1286	0.0810	0.0474	0.0468	0.0268	0.0256	27.1	41.8
7	166+500 RHS slowlane	14/2/2018	1	0.1094	0.0811	0.0541	0.0366	0.0300	0.0181	0.0090	27.2	41.8
7	166+500 RHS slowlane	14/2/2018	2	0.1079	0.0796	0.0526	0.0396	0.0326	0.0230	0.0176	27.2	41.8
7	166+500 RHS slowlane	14/2/2018	3	0.1065	0.0808	0.0529	0.0376	0.0304	0.0225	0.0112	27.2	41.8
7	166+250 RHS slowlane	14/2/2018	1	0.1129	0.0922	0.0534	0.0403	0.0266	0.0152	0.0132	27.2	41.8
7	166+250 RHS slowlane	14/2/2018	2	0.1125	0.0946	0.0545	0.0382	0.0291	0.0129	0.0124	27.2	41.8
7	166+250 RHS slowlane	14/2/2018	3	0.1149	0.0887	0.0587	0.0432	0.0301	0.0200	0.0158	27.2	41.8
7	166+000 RHS slowlane	14/2/2018	1	0.1465	0.1059	0.0668	0.0489	0.0329	0.0203	0.0147	27.2	41.8
7	166+000 RHS slowlane	14/2/2018	2	0.1445	0.1079	0.0674	0.0469	0.0323	0.0183	0.0214	27.2	41.8
7	166+000 RHS slowlane	14/2/2018	3	0.1451	0.1090	0.0684	0.0506	0.0317	0.0238	0.0185	27.2	41.8
7	165+750 RHS slowlane	14/2/2018	1	0.1380	0.0945	0.0540	0.0420	0.0210	0.0193	0.0248	27.2	41.8
7	165+750 RHS slowlane	14/2/2018	2	0.1298	0.0967	0.0556	0.0379	0.0214	0.0148	0.0035	27.2	41.8
7	165+750 RHS slowlane	14/2/2018	3	0.1351	0.0941	0.0530	0.0366	0.0183	0.0194	0.0136	27.2	41.8
7	165+500 RHS slowlane	14/2/2018	1	0.1353	0.1080	0.0678	0.0426	0.0375	0.0215	0.0107	27.2	41.8
7	165+500 RHS slowlane	14/2/2018	2	0.1330	0.1058	0.0707	0.0446	0.0381	0.0225	0.0112	27.2	41.8
7	165+500 RHS slowlane	14/2/2018	3	0.1337	0.1065	0.0693	0.0470	0.0371	0.0252	0.0126	27.2	41.8
7	165+250 RHS slowlane	14/2/2018	1	0.1215	0.0862	0.0559	0.0334	0.0217	0.0212	0.0154	27.2	41.8
7	165+250 RHS slowlane	14/2/2018	2	0.1215	0.0871	0.0549	0.0349	0.0271	0.0186	0.0172	27.2	41.8
7	165+250 RHS slowlane	14/2/2018	3	0.1205	0.0837	0.0543	0.0354	0.0284	0.0201	0.0100	27.2	41.8
7	165+000 RHS slowlane	14/2/2018	1	0.1225	0.0835	0.0546	0.0361	0.0235	0.0193	0.0136	27.3	41.8
7	165+000 RHS slowlane	14/2/2018	2	0.1199	0.0838	0.0541	0.0360	0.0246	0.0225	0.0146	27.2	41.8
7	165+000 RHS slowlane	14/2/2018	3	0.1182	0.0820	0.0522	0.0387	0.0264	0.0165	0.0146	27.2	41.8
7	164+750 RHS slowlane	14/2/2018	1	0.2332	0.1604	0.0859	0.0567	0.0357	0.0270	0.0230	27.2	41.8
7	164+750 RHS slowlane	14/2/2018	2	0.2321	0.1542	0.0859	0.0589	0.0370	0.0263	0.0216	27.2	41.8
7	164+750 RHS slowlane	14/2/2018	3	0.2276	0.1582	0.0878	0.0571	0.0376	0.0265	0.0211	27.2	41.8
7	164+500 RHS slowlane	14/2/2018	1	0.1598	0.1146	0.0690	0.0418	0.0310	0.0208	0.0132	27.2	41.8
7	164+500 RHS slowlane	14/2/2018	2	0.1565	0.1128	0.0637	0.0419	0.0268	0.0206	0.0161	27.2	41.8
7	164+500 RHS slowlane	14/2/2018	3	0.1550	0.1106	0.0656	0.0425	0.0296	0.0191	0.0194	27.2	41.8
7	164+250 RHS slowlane	14/2/2018	1	0.1588	0.1139	0.0671	0.0335	0.0328	0.0243	0.0152	27.2	41.8
7	164+250 RHS slowlane	14/2/2018	2	0.1558	0.1145	0.0653	0.0246	0.0306	0.0253	0.0178	27.2	41.8
7	164+250 RHS slowlane	14/2/2018	3	0.1584	0.1155	0.0659	0.0676	0.0284	0.0194	0.0194	27.2	41.8
7	164+000 RHS slowlane	14/2/2018	1	0.1282	0.0849	0.0488	0.0327	0.0209	0.0104	0.0159	27.2	41.8
7	164+000 RHS slowlane	14/2/2018	2	0.1254	0.0838	0.0489	0.0310	0.0188	0.0165	0.0082	27.2	41.8
7	164+000 RHS slowlane	14/2/2018	3	0.1269	0.0836	0.0489	0.0315	0.0208	0.0150	0.0075	27.2	41.8
7	163+750 RHS slowlane	14/2/2018	1	0.1524	0.0974	0.0539	0.0321	0.0172	0.0086	0.0159	27.3	41.8
7	163+750 RHS slowlane	14/2/2018	2	0.1462	0.0953	0.0520	0.0322	0.0234	0.0163	0.0167	27.3	41.8
7	163+750 RHS slowlane	14/2/2018	3	0.1441	0.0932	0.0522	0.0345	0.0267	0.0167	0.0162	27.3	41.8
7	163+500 RHS slowlane	14/2/2018	1	0.2246	0.1675	0.0975	0.0616	0.0445	0.0290	0.0209	27.3	41.8
7	163+500 RHS slowlane	14/2/2018	2	0.2235	0.1706	0.1060	0.0660	0.0418	0.0206	0.0241	27.3	41.8
7	163+500 RHS slowlane	14/2/2018	3	0.2246	0.1728	0.1025	0.0641	0.0504	0.0208	0.0241	27.3	41.8
7	163+250 RHS slowlane	14/2/2018	1	0.1317	0.0932	0.0566	0.0413	0.0257	0.0198	0.0145	27.4	43.6
7	163+250 RHS slowlane	14/2/2018	2	0.1309	0.0920	0.0546	0.0407	0.0270	0.0181	0.0170	27.3	43.6
7	163+250 RHS slowlane	14/2/2018	3	0.1333	0.0927	0.0582	0.0399	0.0276	0.0142	0.0156	27.3	43.6
7	163+000 RHS slowlane	15/2/2018	1	0.2071	0.1424	0.0718	0.0593	0.0358	0.0327	0.0197	23.8	27.2
7	163+000 RHS slowlane	15/2/2018	2	0.1959	0.1411	0.0728	0.0615	0.0548	0.0254	0.0195	23.9	27.2
7	163+000 RHS slowlane	15/2/2018	3	0.1963	0.1437	0.0726	0.0694	0.0526	0.0168	0.0152	23.9	27.2
7	161+500 RHS slowlane	15/2/2018	1	0.1626	0.1354	0.0853	0.0519	0.0404	0.0250	0.0233	23.8	27.2
7	161+500 RHS slowlane	15/2/2018	2	0.1623	0.1323	0.0842	0.0536	0.0409	0.0285	0.0259	23.9	27.2
7	161+500 RHS slowlane	15/2/2018	3	0.1593	0.1308	0.0813	0.0551	0.0440	0.0296	0.0266	23.8	27.2

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	161+500 RHS slowlane	15/2/2018	1	0.1460	0.1049	0.0722	0.0563	0.0474	0.0362	0.0324	23.8	27.2
7	161+250 RHS slowlane	15/2/2018	2	0.1437	0.1048	0.0728	0.0568	0.0496	0.0352	0.0313	23.8	27.2
7	161+250 RHS slowlane	15/2/2018	3	0.1412	0.1023	0.0709	0.0560	0.0457	0.0353	0.0328	23.8	27.2
7	161+250 RHS slowlane	15/2/2018	1	0.1095	0.0836	0.0611	0.0485	0.0396	0.0297	0.0300	23.8	27.2
7	161+000 RHS slowlane	15/2/2018	2	0.1075	0.0812	0.0575	0.0463	0.0381	0.0272	0.0269	23.8	27.2
7	161+000 RHS slowlane	15/2/2018	3	0.1089	0.0836	0.0611	0.0472	0.0395	0.0284	0.0235	23.8	27.2
7	160+750 RHS slowlane	15/2/2018	1	0.2096	0.1653	0.1025	0.0764	0.0606	0.0309	0.0308	23.8	27.2
7	160+750 RHS slowlane	15/2/2018	2	0.2099	0.1593	0.1025	0.0753	0.0577	0.0394	0.0340	23.8	27.2
7	160+750 RHS slowlane	15/2/2018	3	0.2088	0.1576	0.1034	0.0789	0.0618	0.0428	0.0370	23.8	27.2
7	160+500 RHS slowlane	15/2/2018	1	0.1389	0.1090	0.0720	0.0596	0.0428	0.0322	0.0277	23.8	27.2
7	160+500 RHS slowlane	15/2/2018	2	0.1452	0.1124	0.0758	0.0596	0.0455	0.0353	0.0271	23.8	27.2
7	160+500 RHS slowlane	15/2/2018	3	0.1399	0.1071	0.0717	0.0584	0.0465	0.0333	0.0288	23.7	27.2
7	160+250 RHS slowlane	15/2/2018	1	0.2126	0.1663	0.1073	0.0774	0.0599	0.0413	0.0345	23.8	27.2
7	160+250 RHS slowlane	15/2/2018	2	0.2170	0.1725	0.1113	0.0821	0.0624	0.0459	0.0362	23.8	27.2
7	160+250 RHS slowlane	15/2/2018	3	0.2157	0.1715	0.1125	0.0804	0.0637	0.0454	0.0359	23.8	27.2
7	160+000 RHS slowlane	15/2/2018	1	0.1524	0.1253	0.0842	0.0615	0.0460	0.0324	0.0233	23.8	27.2
7	160+000 RHS slowlane	15/2/2018	2	0.1520	0.1242	0.0841	0.0604	0.0457	0.0328	0.0257	23.8	27.2
7	160+000 RHS slowlane	15/2/2018	3	0.1548	0.1267	0.0863	0.0625	0.0465	0.0355	0.0264	23.8	27.2
7	159+750 RHS slowlane	15/2/2018	1	0.1354	0.1031	0.0631	0.0446	0.0312	0.0207	0.0144	23.8	27.2
7	159+750 RHS slowlane	15/2/2018	2	0.1349	0.1044	0.0656	0.0441	0.0316	0.0212	0.0167	23.9	27.2
7	159+750 RHS slowlane	15/2/2018	3	0.1355	0.1047	0.0657	0.0448	0.0315	0.0217	0.0158	23.8	27.2
7	159+500 RHS slowlane	15/2/2018	1	0.1366	0.1141	0.0688	0.0451	0.0326	0.0207	0.0132	23.9	27.2
7	159+500 RHS slowlane	15/2/2018	2	0.1369	0.1123	0.0708	0.0483	0.0340	0.0234	0.0179	23.9	27.2
7	159+500 RHS slowlane	15/2/2018	3	0.1362	0.1092	0.0730	0.0503	0.0355	0.0228	0.0154	23.9	27.2
7	159+250 RHS slowlane	15/2/2018	1	0.1435	0.1185	0.0772	0.0568	0.0419	0.0292	0.0245	23.9	27.2
7	159+250 RHS slowlane	15/2/2018	2	0.1453	0.1192	0.0779	0.0562	0.0421	0.0318	0.0263	23.9	27.2
7	159+250 RHS slowlane	15/2/2018	3	0.1441	0.1177	0.0778	0.0560	0.0424	0.0306	0.0245	23.9	27.2
7	159+000 RHS slowlane	15/2/2018	1	0.1246	0.0977	0.0633	0.0444	0.0317	0.0219	0.0178	23.9	27.2
7	159+000 RHS slowlane	15/2/2018	2	0.1113	0.0904	0.0618	0.0438	0.0325	0.0233	0.0190	24.0	27.2
7	159+000 RHS slowlane	15/2/2018	3	0.1245	0.0988	0.0647	0.0456	0.0333	0.0277	0.0183	24.0	27.2
7	158+750 RHS slowlane	15/2/2018	1	0.1271	0.1037	0.0641	0.0440	0.0328	0.0204	0.0166	24.0	27.2
7	158+750 RHS slowlane	15/2/2018	2	0.1259	0.0999	0.0630	0.0443	0.0310	0.0207	0.0164	24.0	27.2
7	158+750 RHS slowlane	15/2/2018	3	0.1236	0.1000	0.0631	0.0443	0.0320	0.0210	0.0175	24.0	27.2
7	158+500 RHS slowlane	15/2/2018	1	0.1190	0.0955	0.0631	0.0457	0.0326	0.0225	0.0154	24.0	27.2
7	158+500 RHS slowlane	15/2/2018	2	0.1181	0.0944	0.0645	0.0465	0.0321	0.0233	0.0170	24.0	27.2
7	158+500 RHS slowlane	15/2/2018	3	0.1180	0.0948	0.0640	0.0465	0.0336	0.0222	0.0174	24.0	27.2
7	158+250 RHS slowlane	15/2/2018	1	0.1566	0.1185	0.0704	0.0460	0.0318	0.0168	0.0146	24.0	27.2
7	158+250 RHS slowlane	15/2/2018	2	0.1531	0.1175	0.0706	0.0470	0.0318	0.0194	0.0015	24.0	27.2
7	158+250 RHS slowlane	15/2/2018	3	0.1461	0.1174	0.0622	0.0424	0.0308	0.0122	0.0121	24.0	27.2
7	158+000 RHS slowlane	15/2/2018	1	0.1156	0.0898	0.0588	0.0412	0.0296	0.0190	0.0156	24.1	27.2
7	158+000 RHS slowlane	15/2/2018	2	0.1121	0.0873	0.0578	0.0405	0.0304	0.0196	0.0148	24.1	27.2
7	158+000 RHS slowlane	15/2/2018	3	0.1102	0.0868	0.0575	0.0414	0.0303	0.0201	0.0148	24.1	27.2
7	157+750 RHS slowlane	15/2/2018	1	0.2505	0.1834	0.0925	0.0498	0.0291	0.0212	0.0106	24.1	27.2
7	157+750 RHS slowlane	15/2/2018	2	0.2504	0.1823	0.0918	0.0523	0.0323	0.0218	0.0109	24.1	27.2
7	157+750 RHS slowlane	15/2/2018	3	0.2468	0.1809	0.0951	0.0525	0.0309	0.0210	0.0105	24.1	27.2
7	157+250 RHS slowlane	15/2/2018	1	0.1379	0.0929	0.0519	0.0350	0.0262	0.0143	0.0129	24.2	27.2
7	157+250 RHS slowlane	15/2/2018	2	0.1381	0.0913	0.0526	0.0352	0.0232	0.0177	0.0088	24.2	27.2
7	157+250 RHS slowlane	15/2/2018	3	0.1364	0.0903	0.0520	0.0339	0.0249	0.0163	0.0174	24.2	27.2
7	157+000 RHS slowlane	15/2/2018	1	0.1773	0.1208	0.0665	0.0441	0.0308	0.0210	0.0187	24.2	27.2
7	157+000 RHS slowlane	15/2/2018	2	0.1705	0.1154	0.0662	0.0421	0.0302	0.0224	0.0148	24.2	27.2
7	157+000 RHS slowlane	15/2/2018	3	0.1691	0.1153	0.0660	0.0426	0.0301	0.0210	0.0170	24.2	27.2
7	156+750 RHS slowlane	15/2/2018	1	0.1548	0.1222	0.0758	0.0495	0.0365	0.0238	0.0166	24.1	27.2
7	156+750 RHS slowlane	15/2/2018	2	0.1510	0.1204	0.0738	0.0491	0.0373	0.0226	0.0138	24.1	27.2
7	156+750 RHS slowlane	15/2/2018	3	0.1500	0.1187	0.0724	0.0493	0.0370	0.0226	0.0172	24.1	27.2
7	156+500 RHS slowlane	15/2/2018	1	0.1304	0.1017	0.0638	0.0158	0.0271	0.0135	0.0067	24.2	27.2
7	156+500 RHS slowlane	15/2/2018	2	0.1294	0.0995	0.0634	0.0245	0.0256	0.0151	0.0075	24.2	27.2
7	156+500 RHS slowlane	15/2/2018	3	0.1200	0.0944	0.0602	0.0306	0.0240	0.0145	0.0072	24.3	27.2
7	156+250 RHS slowlane	15/2/2018	1	0.1494	0.1129	0.0730	0.0464	0.0329	0.0187	0.0170	24.5	27.2
7	156+250 RHS slowlane	15/2/2018	2	0.1491	0.1121	0.0723	0.0505	0.0333	0.0228	0.0176	24.5	27.2
7	156+250 RHS slowlane	15/2/2018	3	0.1475	0.1121	0.0718	0.0492	0.0347	0.0228	0.0195	24.5	27.2
7	156+000 RHS slowlane	15/2/2018	1	0.2639	0.1748	0.0955	0.0668	0.0448	0.0373	0.0257	24.5	27.2
7	156+000 RHS slowlane	15/2/2018	2	0.2607	0.1758	0.0973	0.0697	0.0453	0.0385	0.0258	24.5	27.2
7	156+000 RHS slowlane	15/2/2018	3	0.2602	0.1810	0.1012	0.0711	0.0521	0.0370	0.0293	24.5	27.2
7	155+750 RHS slowlane	15/2/2018	1	0.1324	0.1048	0.0708	0.0468	0.0328	0.0215	0.0165	24.6	27.2
7	155+750 RHS slowlane	15/2/2018	2	0.1323	0.1064	0.0701	0.0487	0.0325	0.0230	0.0164	24.6	27.2
7	155+750 RHS slowlane	15/2/2018	3	0.1296	0.1048	0.0689	0.0485	0.0320	0.0230	0.0020	24.6	27.2
7	155+250 RHS slowlane	15/2/2018	1	0.1432	0.1019	0.0561	0.0345	0.0281	0.0208	0.0174	24.6	27.2
7	155+250 RHS slowlane	15/2/2018	2	0.1347	0.0898	0.0515	0.0242	0.0267	0.0254	0.0154	24.5	27.2
7	155+250 RHS slowlane	15/2/2018	3	0.1369	0.0920	0.0536	0.0269	0.0283	0.0253	0.0164	24.5	27.2
7	155+000 RHS slowlane	15/2/2018	1	0.1483	0.1165	0.0820	0.0518	0.0352	0.0266	0.0212	24.4	27.2
7	155+000 RHS slowlane	15/2/2018	2	0.1498	0.1185	0.0868	0.0540	0.0400	0.0313	0.0276	24.4	27.2
7	155+000 RHS slowlane	15/2/2018	3	0.1443	0.1134	0.0899	0.0501	0.0412	0.0348	0.0300	24.5	27.2
7	154+750 RHS slowlane	15/2/2018	1	0.1783	0.1437	0.0909	0.0608	0.0395	0.0308	0.0212	24.4	27.2
7	154+750 RHS slowlane	15/2/2018	2	0.1813	0.1448	0.0905	0.0611	0.0426	0.0291	0.0225	24.4	27.2
7	154+750 RHS slowlane	15/2/2018	3	0.1760	0.1430	0.0896	0.0614	0.0408	0.0315	0.0199	24.4	27.2
7	154+500 RHS slowlane	15/2/2018	1	0.1640	0.1276	0.0799	0.0507	0.0427	0.0128	0.0036	24.5	27.2

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	154+500 RHS slowlane	15/2/2018	2	0.1592	0.1230	0.0781	0.0518	0.0401	0.0112	0.0021	24.5	27.2
7	154+500 RHS slowlane	15/2/2018	3	0.1588	0.1251	0.0779	0.0505	0.0438	0.0040	0.0142	24.5	27.2
7	154+250 RHS slowlane	15/2/2018	1	0.1400	0.1109	0.0686	0.0475	0.0321	0.0239	0.0158	24.3	27.2
7	154+250 RHS slowlane	15/2/2018	2	0.1390	0.1076	0.0649	0.0454	0.0343	0.0244	0.0185	24.3	27.2
7	154+250 RHS slowlane	15/2/2018	3	0.1344	0.1050	0.0606	0.0430	0.0336	0.0245	0.0157	24.2	27.2
7	154+000 RHS slowlane	15/2/2018	1	0.1246	0.1077	0.0666	0.0397	0.0251	0.0184	0.0690	24.2	27.2
7	154+000 RHS slowlane	15/2/2018	2	0.1225	0.1001	0.0652	0.0417	0.0272	0.0191	0.0095	24.1	27.2
7	154+000 RHS slowlane	15/2/2018	3	0.1210	0.0979	0.0651	0.0415	0.0280	0.0194	0.0144	24.1	27.2
7	153+750 RHS slowlane	15/2/2018	1	0.1309	0.1055	0.0720	0.0520	0.0366	0.0241	0.0183	24.0	27.2
7	153+750 RHS slowlane	15/2/2018	2	0.1317	0.1052	0.0713	0.0511	0.0373	0.0237	0.0184	24.0	27.2
7	153+750 RHS slowlane	15/2/2018	3	0.1303	0.1037	0.0709	0.0515	0.0357	0.0247	0.0176	24.0	27.2
7	153+000 RHS slowlane	15/2/2018	1	0.1301	0.1058	0.0708	0.0511	0.0392	0.0251	0.0216	24.2	31.7
7	153+000 RHS slowlane	15/2/2018	2	0.1282	0.1047	0.0725	0.0529	0.0391	0.0285	0.0208	24.2	31.7
7	153+000 RHS slowlane	15/2/2018	3	0.1263	0.1034	0.0708	0.0528	0.0388	0.0275	0.0209	24.2	31.7
7	152+750 RHS slowlane	15/2/2018	1	0.1215	0.0921	0.0608	0.0446	0.0299	0.0208	0.0180	24.3	31.7
7	152+750 RHS slowlane	15/2/2018	2	0.1213	0.0918	0.0587	0.0415	0.0315	0.0196	0.0154	24.3	31.7
7	152+750 RHS slowlane	15/2/2018	3	0.1195	0.0906	0.0589	0.0423	0.0305	0.0210	0.0168	24.3	31.7
7	152+500 RHS slowlane	15/2/2018	1	0.1459	0.1060	0.0682	0.0446	0.0271	0.0224	0.0186	24.4	31.7
7	152+500 RHS slowlane	15/2/2018	2	0.1470	0.1113	0.0701	0.0465	0.0303	0.0215	0.0173	24.3	31.7
7	152+500 RHS slowlane	15/2/2018	3	0.1428	0.1058	0.0690	0.0452	0.0313	0.0222	0.0169	24.4	31.7
7	152+250 RHS slowlane	15/2/2018	1	0.1249	0.0911	0.0627	0.0416	0.0324	0.0172	0.0178	24.5	31.7
7	152+250 RHS slowlane	15/2/2018	2	0.1248	0.0944	0.0640	0.0428	0.0310	0.0196	0.0164	24.5	31.7
7	152+250 RHS slowlane	15/2/2018	3	0.1262	0.0938	0.0622	0.0455	0.0333	0.0184	0.0127	24.5	31.7
7	152+000 RHS slowlane	15/2/2018	1	0.1555	0.1115	0.0719	0.0444	0.0312	0.0204	0.0164	24.7	31.7
7	152+000 RHS slowlane	15/2/2018	2	0.1515	0.1102	0.0712	0.0431	0.0300	0.0203	0.0163	24.6	31.7
7	152+000 RHS slowlane	15/2/2018	3	0.1545	0.1150	0.0724	0.0467	0.0314	0.0208	0.0175	24.6	31.7
7	151+750 RHS slowlane	15/2/2018	1	0.1382	0.0998	0.0609	0.0423	0.0269	0.0132	0.0158	24.7	31.7
7	151+750 RHS slowlane	15/2/2018	2	0.1395	0.1019	0.0634	0.0428	0.0280	0.0186	0.0149	24.7	31.7
7	151+750 RHS slowlane	15/2/2018	3	0.1404	0.1002	0.0629	0.0426	0.0279	0.0182	0.0145	24.7	31.7
7	151+500 RHS slowlane	15/2/2018	1	0.1380	0.1094	0.0578	0.0381	0.0229	0.0136	0.0156	24.8	31.7
7	151+500 RHS slowlane	15/2/2018	2	0.1371	0.1059	0.0571	0.0371	0.0233	0.0196	0.0134	24.8	31.7
7	151+500 RHS slowlane	15/2/2018	3	0.1389	0.1055	0.0576	0.0364	0.0254	0.0214	0.0136	24.8	31.7
7	151+250 RHS slowlane	15/2/2018	1	0.1483	0.1124	0.0700	0.0450	0.0361	0.0162	0.0146	24.9	31.7
7	151+250 RHS slowlane	15/2/2018	2	0.1473	0.1211	0.0722	0.0514	0.0370	0.0198	0.0156	24.8	31.7
7	151+250 RHS slowlane	15/2/2018	3	0.1476	0.1192	0.0696	0.0452	0.0418	0.0123	0.0158	24.8	31.7
7	151+000 RHS slowlane	15/2/2018	1	0.1929	0.1368	0.0778	0.0527	0.0327	0.0236	0.0191	24.8	31.7
7	151+000 RHS slowlane	15/2/2018	2	0.1907	0.1355	0.0788	0.0504	0.0350	0.0281	0.0201	24.8	31.7
7	151+000 RHS slowlane	15/2/2018	3	0.1849	0.1321	0.0760	0.0507	0.0333	0.0244	0.0051	24.8	31.7
7	150+750 RHS slowlane	15/2/2018	1	0.1318	0.0974	0.0575	0.0386	0.0286	0.0208	0.0154	24.8	31.7
7	150+750 RHS slowlane	15/2/2018	2	0.1265	0.0967	0.0553	0.0323	0.0214	0.0222	0.0111	24.8	31.7
7	150+750 RHS slowlane	15/2/2018	3	0.1246	0.0957	0.0570	0.0353	0.0232	0.0238	0.0119	24.8	31.7
7	150+500 RHS slowlane	15/2/2018	1	0.1067	0.0806	0.0554	0.0393	0.0339	0.0249	0.0200	24.8	31.7
7	150+500 RHS slowlane	15/2/2018	2	0.1065	0.0836	0.0592	0.0409	0.0346	0.0283	0.0226	24.8	31.7
7	150+500 RHS slowlane	15/2/2018	3	0.1028	0.0791	0.0569	0.0416	0.0317	0.0239	0.0178	24.8	31.7
7	150+250 RHS slowlane	15/2/2018	1	0.1479	0.1088	0.0697	0.0438	0.0345	0.0239	0.0153	24.8	31.7
7	150+250 RHS slowlane	15/2/2018	2	0.1449	0.1044	0.0695	0.0440	0.0341	0.0231	0.0144	24.8	31.7
7	150+250 RHS slowlane	15/2/2018	3	0.1458	0.1096	0.0694	0.0463	0.0346	0.0237	0.0118	24.8	31.7
7	150+000 RHS slowlane	15/2/2018	1	0.1278	0.0987	0.0659	0.0442	0.0321	0.0237	0.0171	24.9	31.7
7	150+000 RHS slowlane	15/2/2018	2	0.1265	0.0988	0.0653	0.0471	0.0319	0.0230	0.0165	24.8	31.7
7	150+000 RHS slowlane	15/2/2018	3	0.1221	0.0969	0.0660	0.0452	0.0317	0.0214	0.0150	24.8	31.7
7	149+750 RHS slowlane	15/2/2018	1	0.1333	0.1037	0.0656	0.0436	0.0303	0.0200	0.0156	25.0	31.7
7	149+750 RHS slowlane	15/2/2018	2	0.1318	0.1026	0.0657	0.0432	0.0341	0.0228	0.0159	25.0	31.7
7	149+750 RHS slowlane	15/2/2018	3	0.1315	0.1016	0.0667	0.0427	0.0301	0.0203	0.0169	25.0	31.7
7	149+500 RHS slowlane	15/2/2018	1	0.1264	0.0946	0.0580	0.0378	0.0282	0.0177	0.0168	25.0	31.7
7	149+500 RHS slowlane	15/2/2018	2	0.1227	0.0894	0.0560	0.0371	0.0272	0.0188	0.0173	25.0	31.7
7	149+500 RHS slowlane	15/2/2018	3	0.1180	0.0906	0.0567	0.0386	0.0270	0.0205	0.0168	25.0	31.7
7	149+250 RHS slowlane	15/2/2018	1	0.1513	0.1123	0.0624	0.0377	0.0246	0.0185	0.0139	25.1	31.7
7	149+250 RHS slowlane	15/2/2018	2	0.1472	0.1103	0.0633	0.0394	0.0251	0.0165	0.0144	25.0	31.7
7	149+250 RHS slowlane	15/2/2018	3	0.1485	0.1129	0.0660	0.0404	0.0254	0.0173	0.0156	25.0	31.7
7	149+000 RHS slowlane	15/2/2018	1	0.1668	0.1216	0.0704	0.0421	0.0259	0.0196	0.0166	25.1	31.7
7	149+000 RHS slowlane	15/2/2018	2	0.1670	0.1226	0.0715	0.0443	0.0300	0.0216	0.0171	25.1	31.7
7	149+000 RHS slowlane	15/2/2018	3	0.1590	0.1212	0.0662	0.0451	0.0291	0.0117	0.0159	25.1	31.7
7	148+750 RHS slowlane	15/2/2018	1	0.1050	0.0823	0.0580	0.0443	0.0356	0.0252	0.0203	25.2	31.7
7	148+750 RHS slowlane	15/2/2018	2	0.1051	0.0821	0.0571	0.0450	0.0346	0.0265	0.0209	25.2	31.7
7	148+750 RHS slowlane	15/2/2018	3	0.1057	0.0820	0.0581	0.0458	0.0347	0.0260	0.0206	25.2	31.7
7	148+500 RHS slowlane	15/2/2018	1	0.1313	0.0938	0.0627	0.0451	0.0345	0.0226	0.0219	25.2	31.7
7	148+500 RHS slowlane	15/2/2018	2	0.1280	0.0945	0.0622	0.0433	0.0343	0.0231	0.0202	25.2	31.7
7	148+500 RHS slowlane	15/2/2018	3	0.1276	0.0949	0.0597	0.0425	0.0324	0.0230	0.0218	25.2	31.7
7	148+250 RHS slowlane	15/2/2018	1	0.1328	0.1039	0.0570	0.0381	0.0258	0.0159	0.0055	25.2	31.7
7	148+250 RHS slowlane	15/2/2018	2	0.1283	0.0927	0.0594	0.0363	0.0262	0.0174	0.0137	25.2	31.7
7	148+250 RHS slowlane	15/2/2018	3	0.1302	0.1004	0.0595	0.0393	0.0263	0.0157	0.0136	25.2	31.7
7	148+000 RHS slowlane	15/2/2018	1	0.1531	0.1092	0.0588	0.0393	0.0235	0.0168	0.0142	25.2	31.7
7	148+000 RHS slowlane	15/2/2018	2	0.1507	0.1095	0.0603	0.0390	0.0263	0.0183	0.0091	25.3	31.7
7	148+000 RHS slowlane	15/2/2018	3	0.1474	0.1081	0.0613	0.0391	0.0263	0.0158	0.0127	25.3	31.7
7	147+750 RHS slowlane	15/2/2018	1	0.0520	0.0396	0.0304	0.0252	0.0214	0.0167	0.0149	25.4	31.7
7	147+750 RHS slowlane	15/2/2018	2	0.0521	0.0396	0.0292	0.0239	0.0218	0.0166	0.0135	25.4	31.7

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	147+750 RHS slowlane	15/2/2018	3	0.0529	0.0404	0.0307	0.0257	0.0225	0.0185	0.0139	25.4	31.7
7	147+500 RHS slowlane	15/2/2018	1	0.1404	0.0997	0.0608	0.0369	0.0213	0.0156	0.0324	25.5	31.7
7	147+500 RHS slowlane	15/2/2018	2	0.1392	0.0987	0.0572	0.0362	0.0218	0.0136	0.0123	25.5	31.7
7	147+500 RHS slowlane	15/2/2018	3	0.1401	0.0994	0.0581	0.0363	0.0224	0.0160	0.0011	25.5	31.7
7	147+250 RHS slowlane	15/2/2018	1	0.1611	0.1151	0.0702	0.0459	0.0291	0.0210	0.0178	25.5	31.7
7	147+250 RHS slowlane	15/2/2018	2	0.1597	0.1148	0.0718	0.0468	0.0310	0.0212	0.0180	25.5	31.7
7	147+250 RHS slowlane	15/2/2018	3	0.1542	0.1125	0.0686	0.0468	0.0291	0.0216	0.0152	25.5	31.7
7	147+000 RHS slowlane	15/2/2018	1	0.1247	0.0927	0.0560	0.0378	0.0260	0.0210	0.0169	25.6	31.7
7	147+000 RHS slowlane	15/2/2018	2	0.1227	0.0934	0.0586	0.0394	0.0265	0.0188	0.0163	25.6	31.7
7	147+000 RHS slowlane	15/2/2018	3	0.1208	0.0948	0.0592	0.0407	0.0272	0.0201	0.0170	25.6	31.7
7	146+750 RHS slowlane	15/2/2018	1	0.1385	0.1028	0.0658	0.0422	0.0299	0.0191	0.0028	25.7	31.7
7	146+750 RHS slowlane	15/2/2018	2	0.1359	0.1014	0.0658	0.0414	0.0246	0.0178	0.0161	25.7	31.7
7	146+750 RHS slowlane	15/2/2018	3	0.1343	0.1017	0.0625	0.0420	0.0258	0.0180	0.0019	25.7	31.7
7	146+500 RHS slowlane	15/2/2018	1	0.1096	0.0764	0.0481	0.0342	0.0255	0.0161	0.0154	25.7	31.7
7	146+500 RHS slowlane	15/2/2018	2	0.1037	0.0755	0.0490	0.0355	0.0258	0.0189	0.0157	25.7	31.7
7	146+500 RHS slowlane	15/2/2018	3	0.1080	0.0773	0.0497	0.0355	0.0258	0.0185	0.0142	25.7	31.7
7	146+250 RHS slowlane	15/2/2018	1	0.1021	0.0738	0.0479	0.0335	0.0247	0.0198	0.0122	25.7	31.7
7	146+250 RHS slowlane	15/2/2018	2	0.1005	0.0744	0.0491	0.0342	0.0246	0.0204	0.0138	25.7	31.7
7	146+250 RHS slowlane	15/2/2018	3	0.0996	0.0720	0.0488	0.0339	0.0236	0.0233	0.0126	25.7	31.7
7	146+000 RHS slowlane	15/2/2018	1	0.1306	0.0913	0.0566	0.0422	0.0297	0.0249	0.0176	25.6	31.7
7	146+000 RHS slowlane	15/2/2018	2	0.1282	0.0938	0.0582	0.0424	0.0308	0.0235	0.0275	25.6	31.7
7	146+000 RHS slowlane	15/2/2018	3	0.1279	0.0946	0.0567	0.0431	0.0269	0.0278	0.0192	25.6	31.7
7	145+750 RHS slowlane	15/2/2018	1	0.1339	0.1047	0.0650	0.0483	0.0288	0.0217	0.0149	25.6	31.7
7	145+750 RHS slowlane	15/2/2018	2	0.1325	0.1046	0.0670	0.0517	0.0325	0.0242	0.0157	25.5	31.7
7	145+750 RHS slowlane	15/2/2018	3	0.1326	0.1038	0.0671	0.0484	0.0325	0.0224	0.0185	25.5	31.7
7	145+500 RHS slowlane	15/2/2018	1	0.1322	0.0968	0.0726	0.0433	0.0282	0.0159	0.0185	25.6	31.7
7	145+500 RHS slowlane	15/2/2018	2	0.1277	0.0929	0.0653	0.0456	0.0278	0.0172	0.0167	25.5	31.7
7	145+500 RHS slowlane	15/2/2018	3	0.1283	0.1031	0.0665	0.0447	0.0299	0.0225	0.0200	25.5	31.7
7	145+250 RHS slowlane	15/2/2018	1	0.1342	0.1022	0.0694	0.0458	0.0334	0.0217	0.0238	25.6	31.7
7	145+250 RHS slowlane	15/2/2018	2	0.1306	0.1015	0.0670	0.0393	0.0426	0.0159	0.0171	25.6	31.7
7	145+250 RHS slowlane	15/2/2018	3	0.1289	0.0998	0.0683	0.0421	0.0351	0.0199	0.0191	25.6	31.7
7	145+000 RHS slowlane	15/2/2018	1	0.1375	0.1107	0.0749	0.0465	0.0366	0.0261	0.0126	25.6	31.7
7	145+000 RHS slowlane	15/2/2018	2	0.1321	0.1056	0.0737	0.0445	0.0359	0.0258	0.0127	25.6	31.7
7	145+000 RHS slowlane	15/2/2018	3	0.1336	0.1062	0.0723	0.0475	0.0325	0.0250	0.0159	25.6	31.7
7	144+750 RHS slowlane	15/2/2018	1	0.1756	0.1381	0.0700	0.0550	0.0397	0.0176	0.0175	25.6	31.7
7	144+750 RHS slowlane	15/2/2018	2	0.1698	0.1414	0.0734	0.0537	0.0352	0.0229	0.0449	25.6	31.7
7	144+750 RHS slowlane	15/2/2018	3	0.1694	0.1409	0.0733	0.0561	0.0343	0.0140	0.0164	25.6	31.7
7	144+500 RHS slowlane	15/2/2018	1	0.1893	0.1330	0.0732	0.0394	0.0300	0.0148	0.0118	25.6	31.7
7	144+500 RHS slowlane	15/2/2018	2	0.1904	0.1344	0.0735	0.0409	0.0315	0.0176	0.0172	25.5	31.7
7	144+500 RHS slowlane	15/2/2018	3	0.1883	0.1341	0.0725	0.0443	0.0285	0.0212	0.0144	25.5	31.7
7	144+250 RHS slowlane	15/2/2018	1	0.1459	0.1124	0.0644	0.0493	0.0245	0.0182	0.0179	25.7	31.7
7	144+250 RHS slowlane	15/2/2018	2	0.1420	0.1098	0.0632	0.0399	0.0231	0.0149	0.0140	25.6	31.7
7	144+250 RHS slowlane	15/2/2018	3	0.1437	0.1089	0.0643	0.0420	0.0284	0.0167	0.0188	25.6	31.7
7	144+000 RHS slowlane	15/2/2018	1	0.1918	0.1325	0.0629	0.0315	0.0291	0.0194	0.0220	25.6	35.9
7	144+000 RHS slowlane	15/2/2018	2	0.1911	0.1310	0.0642	0.0416	0.0268	0.0183	0.0153	25.6	35.9
7	144+000 RHS slowlane	15/2/2018	3	0.1861	0.1310	0.0620	0.0361	0.0310	0.0203	0.0101	25.6	35.9
7	143+750 RHS slowlane	15/2/2018	1	0.1847	0.1401	0.0751	0.0374	0.0268	0.0427	0.0189	25.7	35.9
7	143+750 RHS slowlane	15/2/2018	2	0.1861	0.1427	0.0771	0.0385	0.0319	0.0439	0.0174	25.7	35.9
7	143+750 RHS slowlane	15/2/2018	3	0.1821	0.1425	0.0756	0.0373	0.0349	0.0335	0.0179	25.7	35.9
7	143+500 RHS slowlane	15/2/2018	1	0.1273	0.1026	0.0568	0.0352	0.0347	0.0185	0.0173	25.7	35.9
7	143+500 RHS slowlane	15/2/2018	2	0.1290	0.1007	0.0579	0.0415	0.0428	0.0210	0.0170	25.7	35.9
7	143+500 RHS slowlane	15/2/2018	3	0.1256	0.1017	0.0594	0.0383	0.0409	0.0232	0.0131	25.7	35.9
7	143+250 RHS slowlane	15/2/2018	1	0.1645	0.1322	0.0829	0.0602	0.0413	0.0206	0.0166	25.7	35.9
7	143+250 RHS slowlane	15/2/2018	2	0.1681	0.1362	0.0857	0.0493	0.0469	0.0130	0.0235	25.8	35.9
7	143+250 RHS slowlane	15/2/2018	3	0.1640	0.1342	0.0824	0.0535	0.0437	0.0163	0.0197	25.7	35.9
7	143+000 RHS slowlane	15/2/2018	1	0.1070	0.0856	0.0518	0.0339	0.0296	0.0214	0.0107	25.8	35.9
7	143+000 RHS slowlane	15/2/2018	2	0.1041	0.0846	0.0528	0.0339	0.0286	0.0179	0.0089	25.8	35.9
7	143+000 RHS slowlane	15/2/2018	3	0.1068	0.0835	0.0532	0.0345	0.0298	0.0264	0.0376	25.8	35.9
7	142+750 RHS slowlane	15/2/2018	1	0.1755	0.1166	0.0682	0.0529	0.0304	0.0148	0.0137	25.8	35.9
7	142+750 RHS slowlane	15/2/2018	2	0.1715	0.1151	0.0616	0.0426	0.0346	0.0155	0.0182	25.8	35.9
7	142+750 RHS slowlane	15/2/2018	3	0.1724	0.1263	0.0608	0.0283	0.0448	0.0187	0.0178	25.8	35.9
7	142+500 RHS slowlane	15/2/2018	1	0.1287	0.0907	0.0443	0.0417	0.0280	0.0140	0.0193	25.8	35.9
7	142+500 RHS slowlane	15/2/2018	2	0.1287	0.0922	0.0487	0.0405	0.0288	0.0144	0.0138	25.8	35.9
7	142+500 RHS slowlane	15/2/2018	3	0.1236	0.0842	0.0502	0.0374	0.0270	0.0124	0.0133	25.8	35.9
7	142+250 RHS slowlane	15/2/2018	1	0.1208	0.0872	0.0596	0.0282	0.0397	0.0361	0.0167	25.8	35.9
7	142+250 RHS slowlane	15/2/2018	2	0.1200	0.0870	0.0589	0.0321	0.0366	0.0256	0.0170	25.8	35.9
7	142+250 RHS slowlane	15/2/2018	3	0.1174	0.0860	0.0623	0.0302	0.0430	0.0253	0.0200	25.7	35.9
7	142+000 RHS slowlane	15/2/2018	1	0.1186	0.0832	0.0516	0.0366	0.0237	0.0145	0.0172	25.8	35.9
7	142+000 RHS slowlane	15/2/2018	2	0.1189	0.0865	0.0528	0.0371	0.0285	0.0180	0.0181	25.8	35.9
7	142+000 RHS slowlane	15/2/2018	3	0.1160	0.0832	0.0562	0.0320	0.0289	0.0161	0.0204	25.8	35.9
7	141+750 RHS slowlane	15/2/2018	1	0.1083	0.0828	0.0502	0.0359	0.0243	0.0194	0.0132	25.8	35.9
7	141+750 RHS slowlane	15/2/2018	2	0.1173	0.0855	0.0504	0.0383	0.0243	0.0210	0.0154	25.8	35.9
7	141+750 RHS slowlane	15/2/2018	3	0.1156	0.0831	0.0525	0.0369	0.0252	0.0194	0.0157	25.8	35.9
7	141+500 RHS slowlane	15/2/2018	1	0.1398	0.1008	0.0581	0.0371	0.0266	0.0189	0.0185	25.8	35.9
7	141+500 RHS slowlane	15/2/2018	2	0.1370	0.0957	0.0539	0.0371	0.0251	0.0203	0.0155	25.8	35.9
7	141+500 RHS slowlane	15/2/2018	3	0.1356	0.0998	0.0567	0.0395	0.0271	0.0194	0.0194	25.8	35.9

Road	Location	Date	Drop	Geophone1 (mm)	Geophone2 (mm)	Geophone3 (mm)	Geophone4 (mm)	Geophone5 (mm)	Geophone6 (mm)	Geophone7 (mm)	Air Temp. (°C)	Manual Temp. (°C)
7	141+250 RHS slowlane	15/2/2018	1	0.1131	0.0888	0.0625	0.0458	0.0268	0.0186	0.0167	25.9	35.9
7	141+250 RHS slowlane	15/2/2018	2	0.1135	0.0898	0.0577	0.0398	0.0308	0.0188	0.0232	25.9	35.9
7	141+250 RHS slowlane	15/2/2018	3	0.1097	0.0856	0.0543	0.0401	0.0280	0.0197	0.0204	25.9	35.9
7	141+000 RHS slowlane	15/2/2018	1	0.1558	0.1070	0.0590	0.0410	0.0301	0.0229	0.0114	25.9	35.9
7	141+000 RHS slowlane	15/2/2018	2	0.1487	0.1004	0.0581	0.0306	0.0256	0.0210	0.0105	25.9	35.9
7	141+000 RHS slowlane	15/2/2018	3	0.1517	0.1000	0.0605	0.0373	0.0192	0.0194	0.0097	25.9	35.9
7	140+750 RHS slowlane	15/2/2018	1	0.1812	0.1249	0.0738	0.0414	0.0334	0.0165	0.0185	26.0	35.9
7	140+750 RHS slowlane	15/2/2018	2	0.1811	0.1264	0.0753	0.0409	0.0353	0.0179	0.0170	25.9	35.9
7	140+750 RHS slowlane	15/2/2018	3	0.1742	0.1276	0.0730	0.0416	0.0348	0.0210	0.0191	25.9	35.9
7	140+500 RHS slowlane	15/2/2018	1	0.1037	0.0759	0.0527	0.0389	0.0273	0.0189	0.0094	26.0	35.9
7	140+500 RHS slowlane	15/2/2018	2	0.1033	0.0794	0.0530	0.0478	0.0254	0.0181	0.0090	25.9	35.9
7	140+500 RHS slowlane	15/2/2018	3	0.1021	0.0803	0.0506	0.0412	0.0246	0.0149	0.0074	25.9	35.9
7	140+000 RHS slowlane	15/2/2018	1	0.1723	0.1205	0.0717	0.0402	0.0367	0.0245	0.0163	26.0	35.9
7	140+000 RHS slowlane	15/2/2018	2	0.1639	0.1227	0.0668	0.0349	0.0389	0.0335	0.0038	26.0	35.9
7	140+000 RHS slowlane	15/2/2018	3	0.1631	0.1207	0.0684	0.0401	0.0347	0.0268	0.0157	26.0	35.9
7	139+750 RHS slowlane	15/2/2018	1	0.1777	0.1231	0.0691	0.0451	0.0337	0.0231	0.0214	26.0	35.9
7	139+750 RHS slowlane	15/2/2018	2	0.1722	0.1185	0.0721	0.0457	0.0340	0.0238	0.0223	26.0	35.9
7	139+750 RHS slowlane	15/2/2018	3	0.1709	0.1136	0.0619	0.0373	0.0278	0.0195	0.0228	26.0	35.9
7	139+500 RHS slowlane	15/2/2018	1	0.1960	0.1397	0.0781	0.0553	0.0319	0.0186	0.0204	26.0	35.9
7	139+500 RHS slowlane	15/2/2018	2	0.1899	0.1385	0.0789	0.0525	0.0353	0.0254	0.0185	26.0	35.9
7	139+500 RHS slowlane	15/2/2018	3	0.1893	0.1380	0.0810	0.0523	0.0360	0.0235	0.0206	26.0	35.9
7	139+250 RHS slowlane	15/2/2018	1	0.1856	0.1272	0.0725	0.0469	0.0293	0.0202	0.0198	26.0	35.9
7	139+250 RHS slowlane	15/2/2018	2	0.1808	0.1248	0.0739	0.0409	0.0278	0.0202	0.0155	26.0	35.9
7	139+250 RHS slowlane	15/2/2018	3	0.1768	0.1245	0.0739	0.0417	0.0270	0.0206	0.0146	26.0	35.9
7	139+000 RHS slowlane	15/2/2018	1	0.1422	0.1073	0.0693	0.0451	0.0308	0.0210	0.0158	25.9	35.9
7	139+000 RHS slowlane	15/2/2018	2	0.1367	0.1051	0.0657	0.0415	0.0274	0.0190	0.0197	25.9	35.9
7	139+000 RHS slowlane	15/2/2018	3	0.1365	0.1064	0.0674	0.0446	0.0293	0.0182	0.0170	25.9	35.9
7	138+750 RHS slowlane	15/2/2018	1	0.1220	0.0902	0.0642	0.0417	0.0323	0.0237	0.0149	26.0	35.9
7	138+750 RHS slowlane	15/2/2018	2	0.1238	0.0900	0.0585	0.0455	0.0286	0.0210	0.0136	25.9	35.9
7	138+750 RHS slowlane	15/2/2018	3	0.1215	0.0895	0.0604	0.0477	0.0315	0.0240	0.0156	25.9	35.9
7	138+500 RHS slowlane	15/2/2018	1	0.1997	0.1509	0.0883	0.0554	0.0398	0.0269	0.0239	25.9	35.9
7	138+500 RHS slowlane	15/2/2018	2	0.1931	0.1470	0.0851	0.0545	0.0366	0.0266	0.0212	25.9	35.9
7	138+500 RHS slowlane	15/2/2018	3	0.1904	0.1465	0.0826	0.0537	0.0361	0.0265	0.0246	25.9	35.9
7	138+250 RHS slowlane	15/2/2018	1	0.1256	0.0937	0.0491	0.0385	0.0223	0.0176	0.0135	25.9	35.9
7	138+250 RHS slowlane	15/2/2018	2	0.1245	0.0919	0.0594	0.0383	0.0206	0.0190	0.0118	25.9	35.9
7	138+250 RHS slowlane	15/2/2018	3	0.1256	0.0952	0.0531	0.0384	0.0240	0.0195	0.0150	25.9	35.9
7	138+000 RHS slowlane	15/2/2018	1	0.1068	0.0724	0.0386	0.0246	0.0192	0.0096	0.0368	26.0	35.9
7	138+000 RHS slowlane	15/2/2018	2	0.1061	0.0530	0.0392	0.0256	0.0196	0.0369	0.0165	26.0	35.9
7	138+000 RHS slowlane	15/2/2018	3	0.1065	0.0588	0.0437	0.0234	0.0199	0.0099	0.0230	26.0	35.9
7	137+750 RHS slowlane	15/2/2018	1	0.1304	0.0987	0.0628	0.0413	0.0289	0.0165	0.0131	26.1	35.9
7	137+750 RHS slowlane	15/2/2018	2	0.1287	0.1010	0.0667	0.0409	0.0282	0.0141	0.0139	26.1	35.9
7	137+750 RHS slowlane	15/2/2018	3	0.1289	0.0965	0.0648	0.0378	0.0280	0.0120	0.0137	26.0	35.9
7	137+500 RHS slowlane	15/2/2018	1	0.1736	0.1300	0.0745	0.0488	0.0271	0.0204	0.0129	26.1	35.9
7	137+500 RHS slowlane	15/2/2018	2	0.1728	0.1284	0.0745	0.0469	0.0289	0.0193	0.0150	26.1	35.9
7	137+500 RHS slowlane	15/2/2018	3	0.1677	0.1273	0.0752	0.0506	0.0248	0.0213	0.0153	26.1	35.9
7	137+250 RHS slowlane	15/2/2018	1	0.1775	0.1242	0.0794	0.0482	0.0283	0.0194	0.0182	26.1	35.9
7	137+250 RHS slowlane	15/2/2018	2	0.1770	0.1281	0.0791	0.0484	0.0321	0.0215	0.0176	26.1	35.9
7	137+250 RHS slowlane	15/2/2018	3	0.1765	0.1227	0.0755	0.0478	0.0318	0.0219	0.0200	26.1	35.9
7	137+000 RHS slowlane	15/2/2018	1	0.1328	0.1044	0.0689	0.0426	0.0249	0.0566	0.0283	26.0	35.9
7	137+000 RHS slowlane	15/2/2018	2	0.1326	0.1074	0.0687	0.0414	0.0238	0.0136	0.0124	26.1	35.9
7	137+000 RHS slowlane	15/2/2018	3	0.1346	0.1074	0.0694	0.0411	0.0272	0.0136	0.0015	26.0	35.9
7	136+750 RHS slowlane	15/2/2018	1	0.1270	0.0930	0.0611	0.0345	0.0286	0.0168	0.0139	26.0	39
7	136+750 RHS slowlane	15/2/2018	2	0.1284	0.0938	0.0619	0.0368	0.0273	0.0156	0.0132	26.0	39
7	136+750 RHS slowlane	15/2/2018	3	0.1254	0.0914	0.0600	0.0361	0.0260	0.0167	0.0083	26.1	39
7	136+500 RHS slowlane	15/2/2018	1	0.1621	0.1240	0.0798	0.0524	0.0376	0.0158	0.0261	26.1	39
7	136+500 RHS slowlane	15/2/2018	2	0.1598	0.1222	0.0790	0.0566	0.0392	0.0270	0.0199	26.1	39
7	136+500 RHS slowlane	15/2/2018	3	0.1572	0.1218	0.0776	0.0533	0.0379	0.0214	0.0221	26.1	39
7	136+250 RHS slowlane	15/2/2018	1	0.1305	0.0934	0.0616	0.0408	0.0306	0.0166	0.0083	26.2	39
7	136+250 RHS slowlane	15/2/2018	2	0.1299	0.0992	0.0606	0.0421	0.0297	0.0203	0.0160	26.2	39
7	136+250 RHS slowlane	15/2/2018	3	0.1271	0.0990	0.0689	0.0418	0.0322	0.0243	0.0169	26.2	39
7	136+000 RHS slowlane	15/2/2018	1	0.1284	0.0895	0.0491	0.0397	0.0233	0.0124	0.0142	26.1	39
7	136+000 RHS slowlane	15/2/2018	2	0.1291	0.0919	0.0469	0.0423	0.0201	0.0145	0.0154	26.1	39
7	136+000 RHS slowlane	15/2/2018	3	0.1291	0.0908	0.0481	0.0434	0.0244	0.0185	0.0175	26.1	39
7	135+750 RHS slowlane	15/2/2018	1	0.1278	0.0889	0.0563	0.0395	0.0288	0.0170	0.0176	26.1	39
7	135+750 RHS slowlane	15/2/2018	2	0.1241	0.0919	0.0561	0.0405	0.0283	0.0227	0.0170	26.1	39
7	135+750 RHS slowlane	15/2/2018	3	0.1236	0.0892	0.0573	0.0349	0.0278	0.0218	0.0174	26.1	39
7	135+500 RHS slowlane	15/2/2018	1	0.1262	0.0992	0.0655	0.0405	0.0237	0.0538	0.0269	26.1	39
7	135+500 RHS slowlane	15/2/2018	2	0.1260	0.1020	0.0653	0.0393	0.0226	0.0129	0.0118	26.1	39
7	135+500 RHS slowlane	15/2/2018	3	0.1279	0.1020	0.0659	0.0390	0.0258	0.0129	0.0014	26.2	39

## ANNEXURE 5 IRI AND RUT RESULTS



## INTERNATIONAL ROUGHNESS INDEX (IRI) - LHS

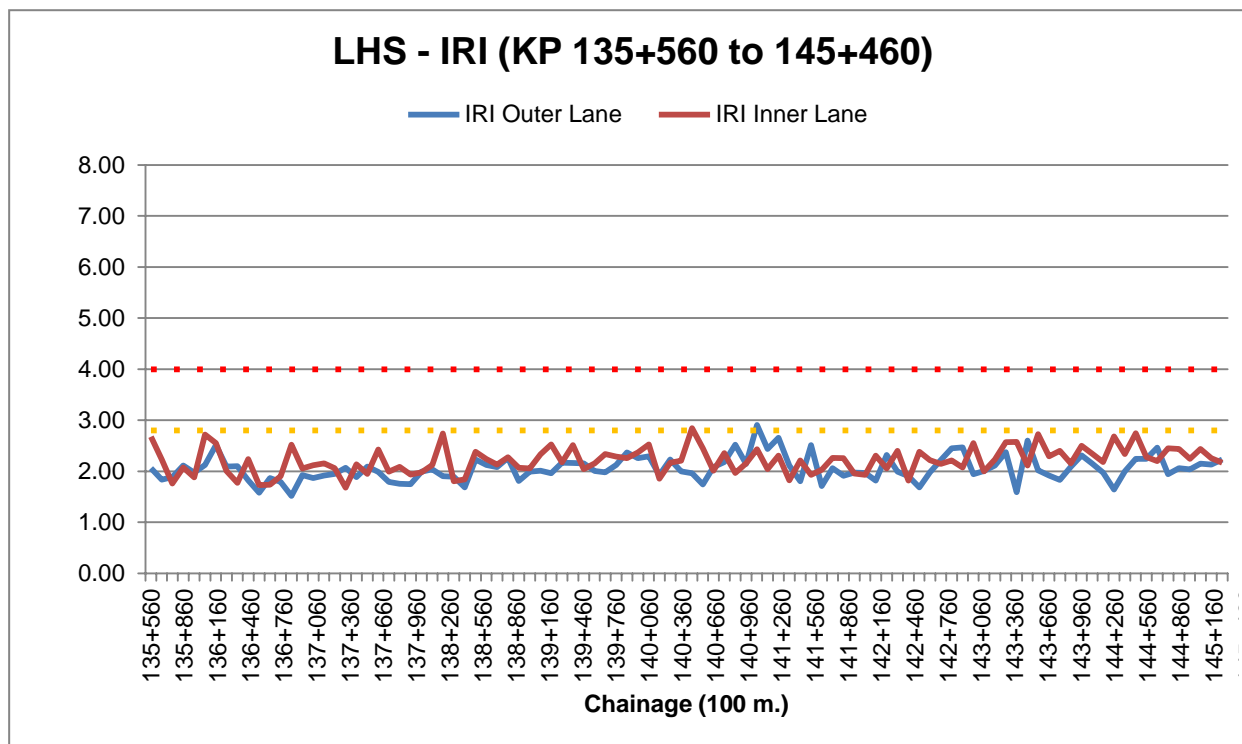


Figure 1. LHS - IRI (KP 135+560 to 145+460)

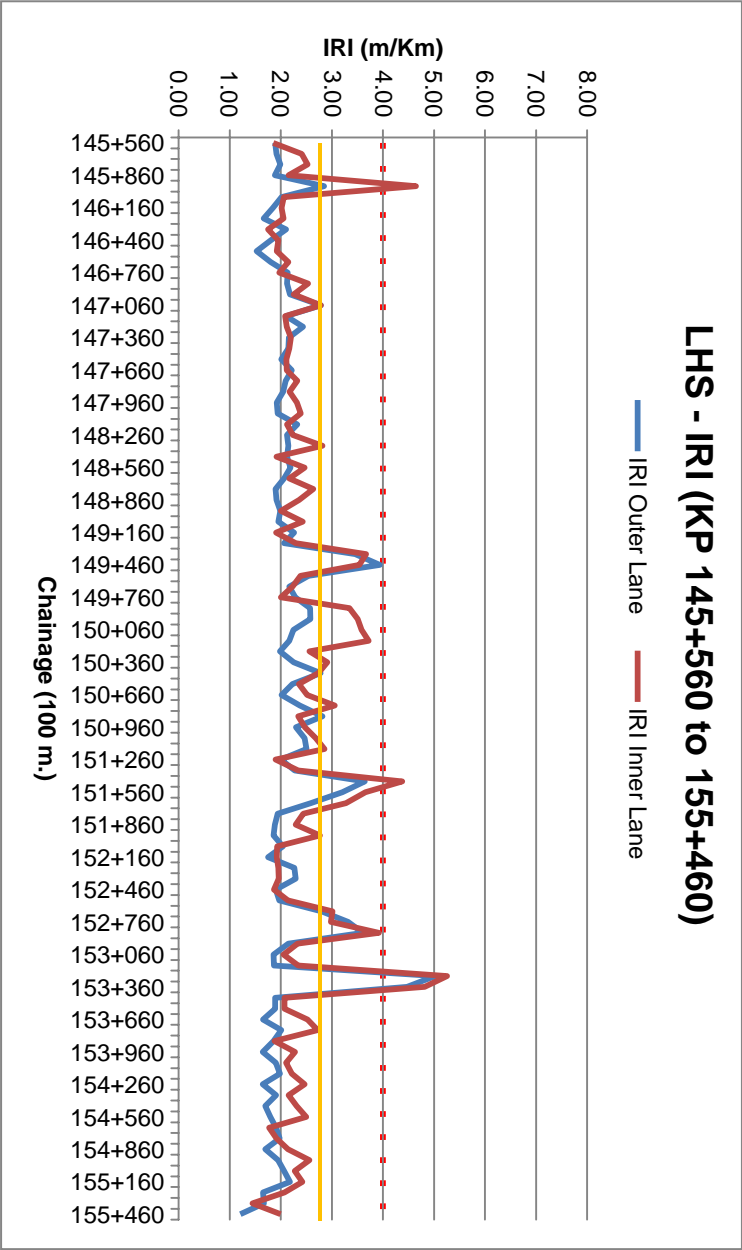


Figure 2. LHS - IRI (KP 145+560 to 155+460)

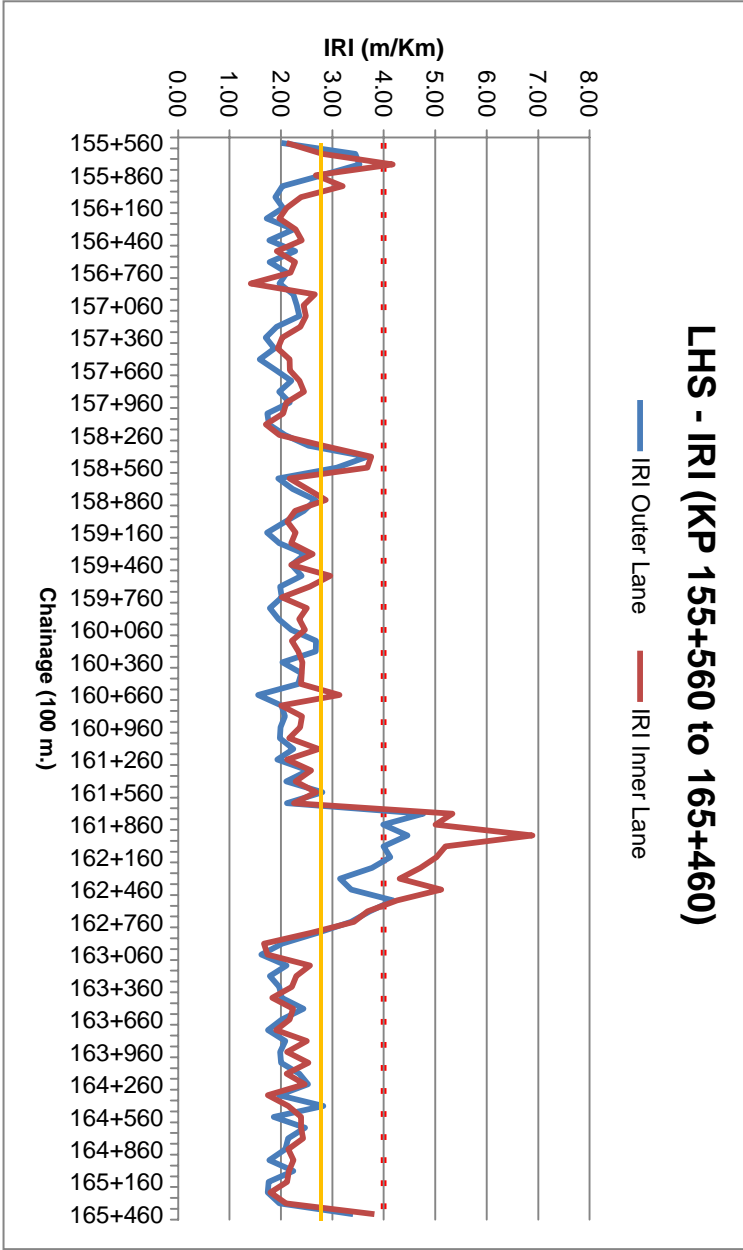


Figure 3. LHS - IRI (KP 155+560 to 165+460)



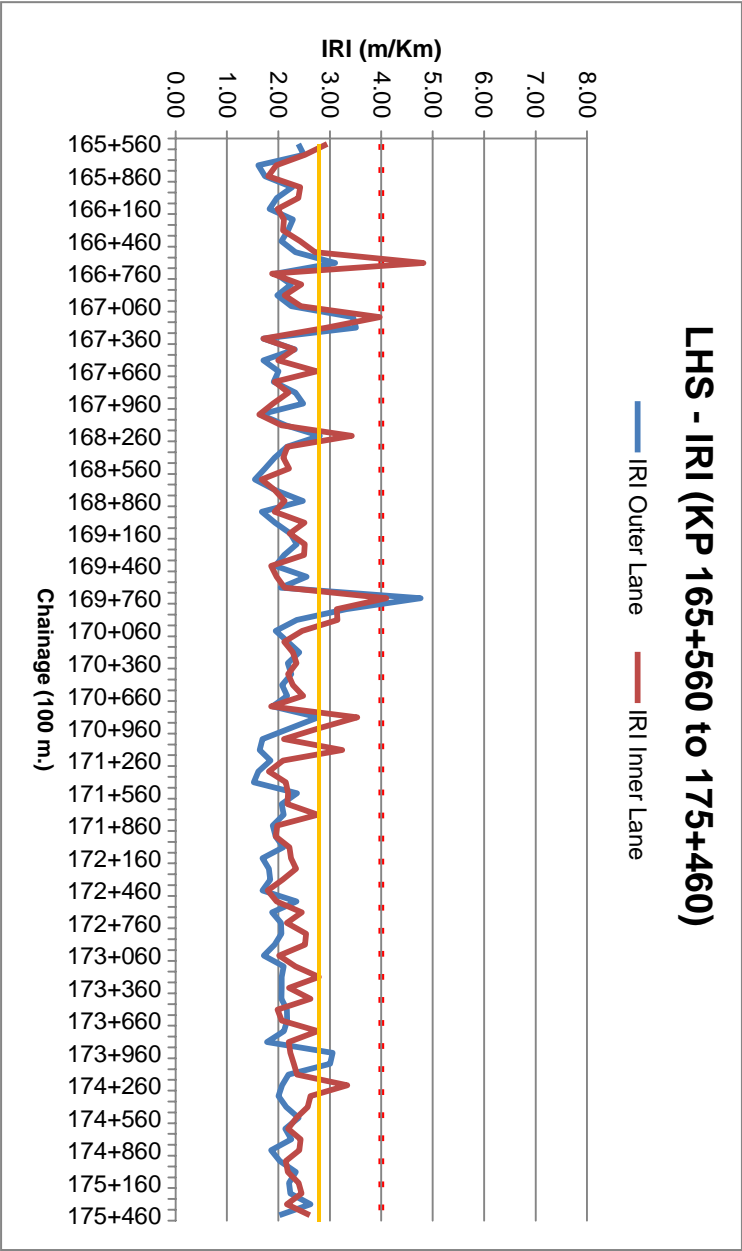


Figure 4. LHS - IRI (KP 165+560 to 175+460)

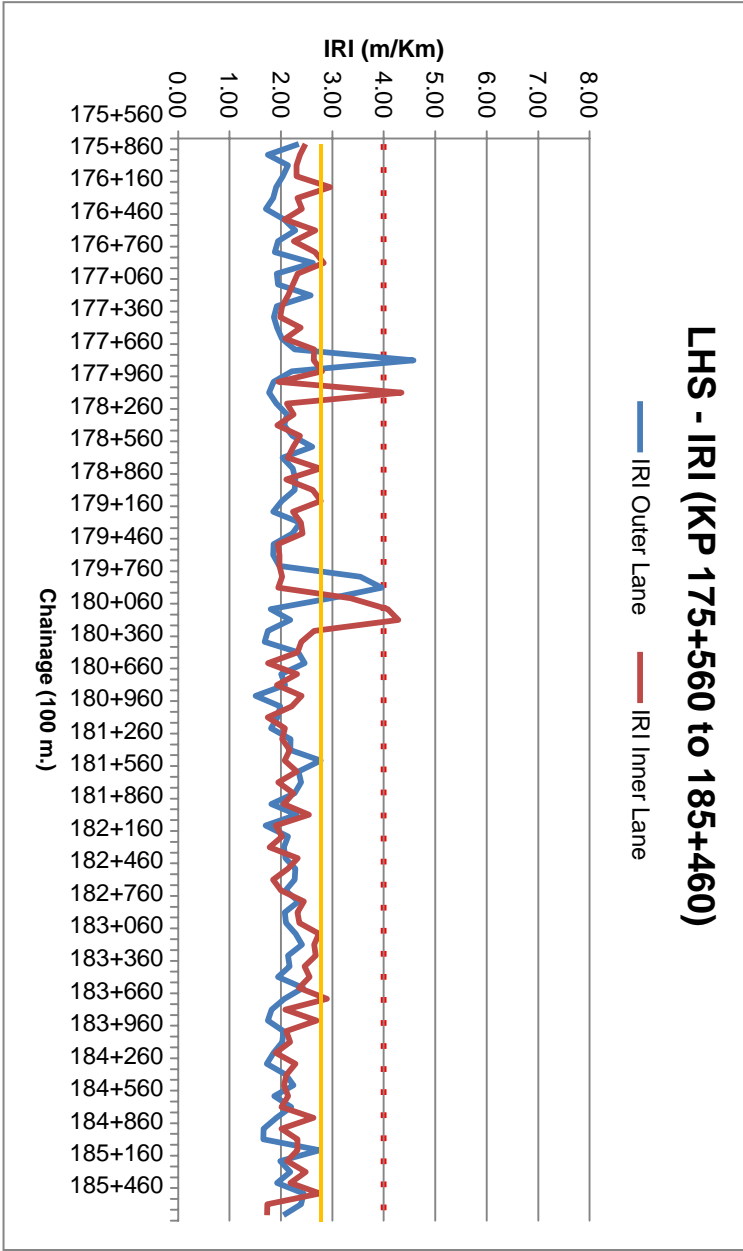


Figure 5. LHS - IRI (KP 175+560 to 185+460)

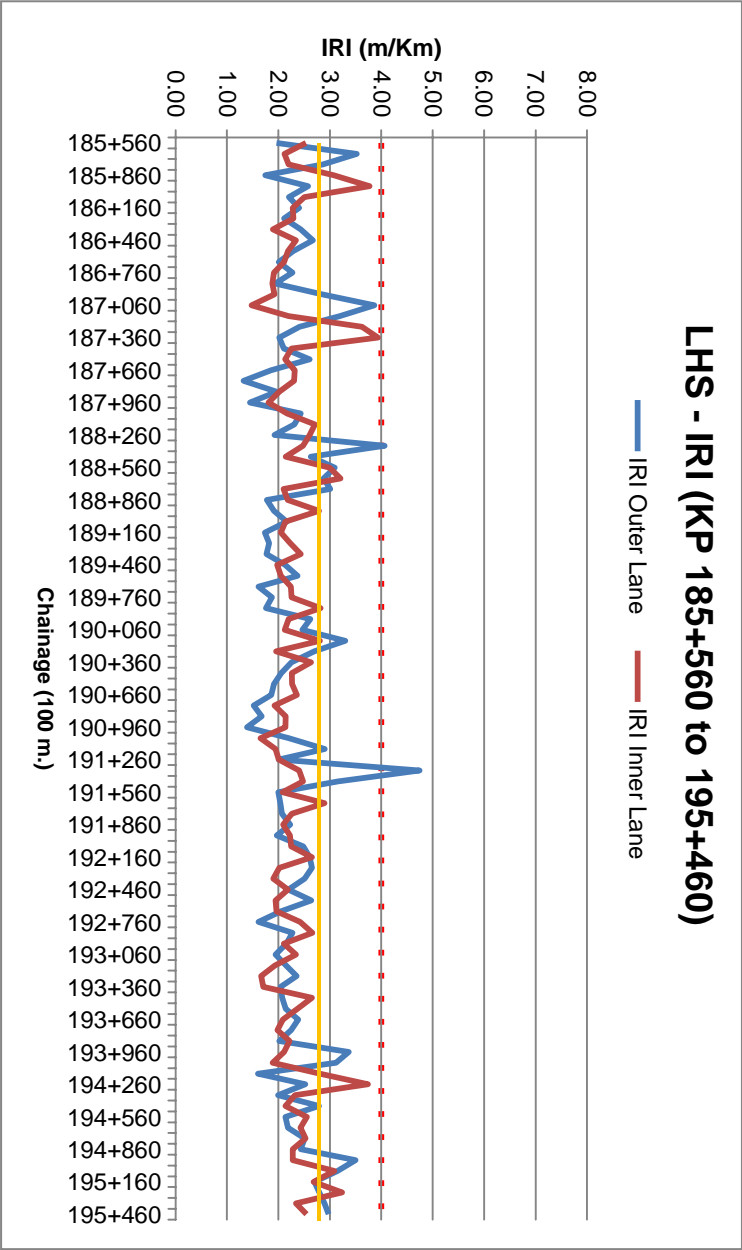


Figure 6. LHS - IRI (KP 185+560 to 195+460)

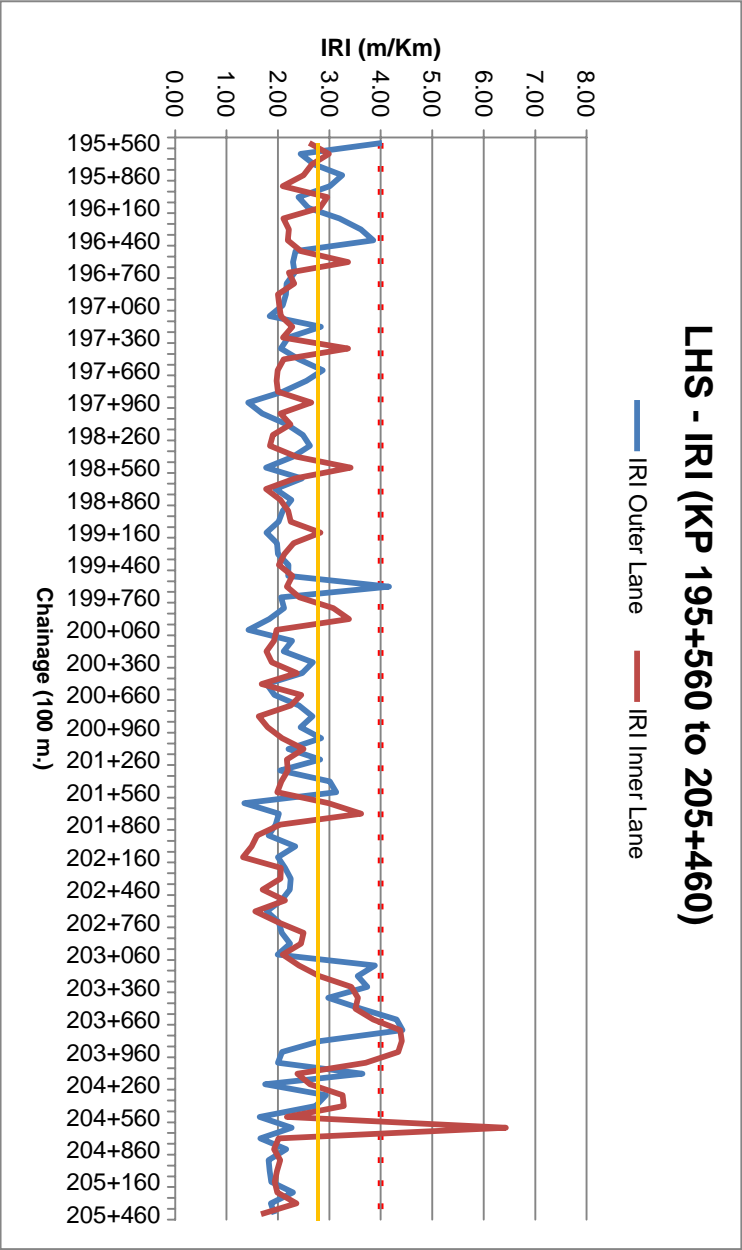


Figure 7. LHS - IRI (KP 195+560 to 205+460)

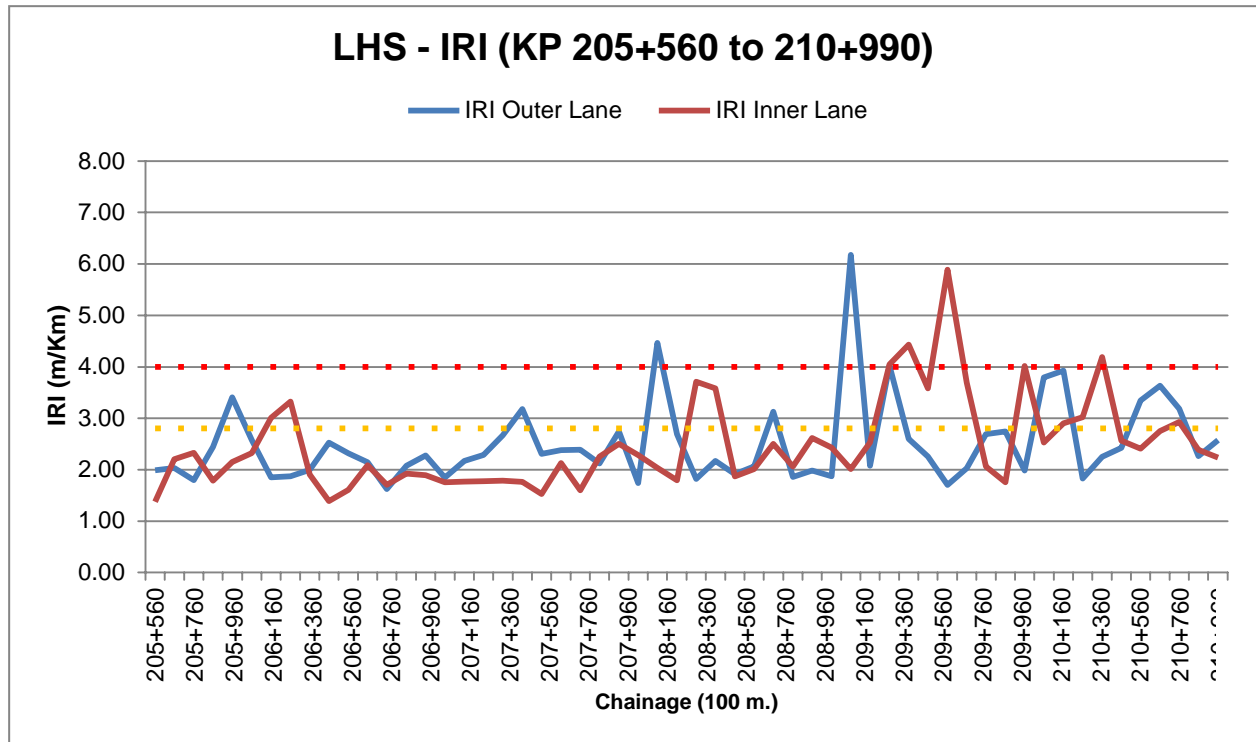


Figure 8. LHS - IRI (KP 205+560 to 210+990)

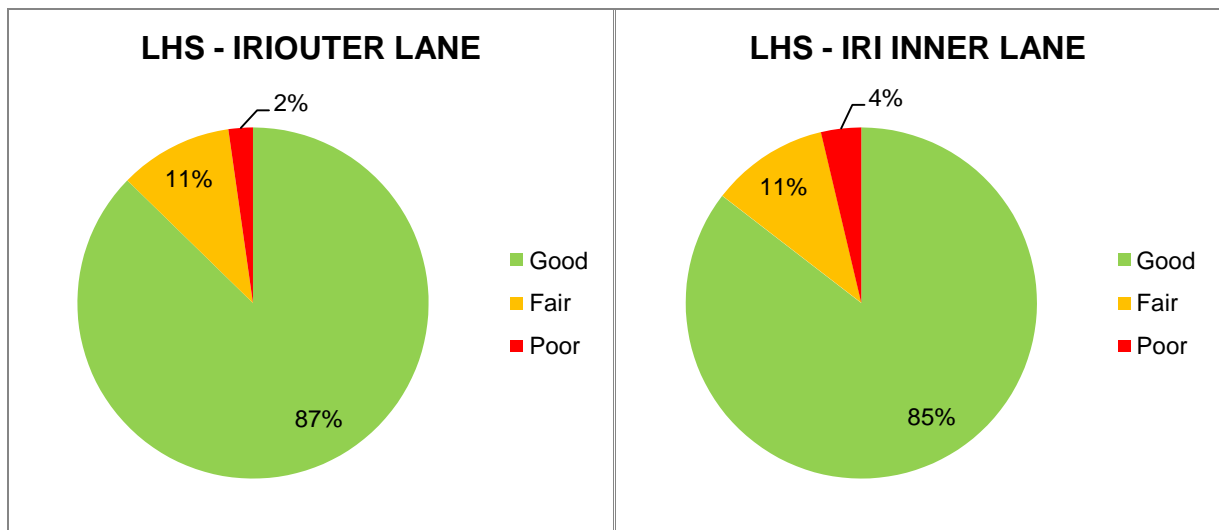


Figure 9. IRI LHS Outer and Inner Lanes Results

KP	LHS Outer Lane	LHS Inner Lane
135+560	2.1	2.7
135+660	1.8	2.2
135+760	1.9	1.8
135+860	2.1	2.1
135+960	2.0	1.9
136+060	2.1	2.7
136+160	2.5	2.5
136+260	2.1	2.0
136+360	2.1	1.8
136+460	1.8	2.2
136+560	1.6	1.7
136+660	1.9	1.7
136+760	1.8	1.9
136+860	1.5	2.5
136+960	1.9	2.1
137+060	1.9	2.1
137+160	1.9	2.2
137+260	2.0	2.1
137+360	2.1	1.7
137+460	1.9	2.1
137+560	2.1	2.0
137+660	2.0	2.4
137+760	1.8	2.0
137+860	1.8	2.1
137+960	1.8	1.9
138+060	2.0	2.0
138+160	2.0	2.1
138+260	1.9	2.7
138+360	1.9	1.8
138+460	1.7	1.8
138+560	2.2	2.4
138+660	2.1	2.2
138+760	2.1	2.1
138+860	2.3	2.3
138+960	1.8	2.1
139+060	2.0	2.1
139+160	2.0	2.3
139+260	2.0	2.5
139+360	2.2	2.2
139+460	2.2	2.5
139+560	2.2	2.0
139+660	2.0	2.2
139+760	2.0	2.3
139+860	2.1	2.3
139+960	2.4	2.3
140+060	2.3	2.4

KP	LHS Outer Lane	LHS Inner Lane
140+160	2.3	2.5
140+260	1.9	1.9
140+360	2.2	2.2
140+460	2.0	2.2
140+560	2.0	2.8
140+660	1.7	2.4
140+760	2.1	2.0
140+860	2.2	2.4
140+960	2.5	2.0
141+060	2.1	2.2
141+160	2.9	2.4
141+260	2.4	2.0
141+360	2.7	2.3
141+460	2.1	1.8
141+560	1.8	2.2
141+660	2.5	1.9
141+760	1.7	2.0
141+860	2.1	2.3
141+960	1.9	2.3
142+060	2.0	2.0
142+160	2.0	1.9
142+260	1.8	2.3
142+360	2.3	2.1
142+460	2.0	2.4
142+560	1.9	1.8
142+660	1.7	2.4
142+760	2.0	2.2
142+860	2.2	2.1
142+960	2.4	2.2
143+060	2.5	2.1
143+160	1.9	2.5
143+260	2.0	2.0
143+360	2.1	2.2
143+460	2.4	2.6
143+560	1.6	2.6
143+660	2.6	2.1
143+760	2.0	2.7
143+860	1.9	2.3
143+960	1.8	2.4
144+060	2.1	2.2
144+160	2.3	2.5
144+260	2.1	2.3
144+360	2.0	2.2
144+460	1.6	2.7
144+560	2.0	2.3
144+660	2.2	2.7

KP	LHS Outer Lane	LHS Inner Lane
144+760	2.2	2.3
144+860	2.5	2.2
144+960	1.9	2.4
145+060	2.1	2.4
145+160	2.0	2.2
145+260	2.2	2.4
145+360	2.1	2.3
145+460	2.2	2.2
145+560	1.9	1.9
145+660	1.9	2.4
145+760	2.0	2.5
145+860	1.9	2.2
145+960	2.9	4.6
146+060	2.0	2.1
146+160	1.9	2.0
146+260	1.7	2.1
146+360	2.1	1.8
146+460	1.8	2.0
146+560	1.5	1.9
146+660	1.8	2.2
146+760	2.1	2.0
146+860	2.1	2.5
146+960	2.2	2.3
147+060	2.8	2.8
147+160	2.1	2.1
147+260	2.4	2.1
147+360	2.2	2.2
147+460	2.2	2.2
147+560	2.0	2.1
147+660	2.2	2.1
147+760	2.1	2.3
147+860	2.0	2.2
147+960	1.9	2.3
148+060	1.9	2.4
148+160	2.3	2.1
148+260	2.1	2.2
148+360	2.1	2.8
148+460	2.1	1.9
148+560	2.2	2.5
148+660	2.1	2.2
148+760	1.9	2.6
148+860	1.9	2.4
148+960	2.0	2.0
149+060	2.0	2.4
149+160	2.3	1.9
149+260	2.1	2.3

KP	LHS Outer Lane	LHS Inner Lane
149+360	3.5	3.7
149+460	3.9	3.5
149+560	2.5	2.4
149+660	2.2	2.2
149+760	2.3	2.0
149+860	2.6	3.3
149+960	2.6	3.5
150+060	2.3	3.6
150+160	2.2	3.7
150+260	2.0	2.6
150+360	2.3	2.9
150+460	2.8	2.7
150+560	2.2	2.4
150+660	2.0	2.5
150+760	2.4	3.1
150+860	2.8	2.3
150+960	2.3	2.5
151+060	2.5	2.7
151+160	2.5	2.9
151+260	2.0	1.9
151+360	2.3	2.3
151+460	3.6	4.4
151+560	3.2	3.7
151+660	2.6	3.3
151+760	1.9	2.4
151+860	1.9	2.3
151+960	1.9	2.8
152+060	2.0	1.9
152+160	1.8	1.9
152+260	2.3	2.0
152+360	2.3	2.0
152+460	1.9	1.9
152+560	2.0	2.1
152+660	2.8	3.0
152+760	3.3	3.0
152+860	3.6	3.9
152+960	2.1	2.3
153+060	1.9	2.1
153+160	1.9	2.3
153+260	5.0	5.3
153+360	4.5	4.8
153+460	1.9	2.1
153+560	1.9	2.1
153+660	1.7	2.5
153+760	2.0	2.7
153+860	1.9	1.9

KP	LHS Outer Lane	LHS Inner Lane
153+960	1.7	2.3
154+060	1.9	2.1
154+160	2.0	2.2
154+260	1.6	2.5
154+360	1.9	2.2
154+460	1.7	2.3
154+560	1.8	2.5
154+660	1.9	1.8
154+760	2.0	1.9
154+860	1.7	2.1
154+960	2.0	2.6
155+060	2.1	2.3
155+160	2.2	2.4
155+260	1.7	2.1
155+360	1.7	1.4
155+460	1.2	2.0
155+560	2.0	2.1
155+660	3.4	2.8
155+760	3.5	4.2
155+860	2.8	2.7
155+960	2.0	3.2
156+060	1.9	2.4
156+160	2.0	2.1
156+260	1.7	2.0
156+360	2.3	2.3
156+460	1.8	2.4
156+560	2.3	1.9
156+660	1.8	2.3
156+760	2.1	2.2
156+860	2.0	1.4
156+960	2.2	2.7
157+060	2.3	2.4
157+160	2.4	2.5
157+260	1.9	2.4
157+360	1.7	2.0
157+460	1.9	1.9
157+560	1.6	2.2
157+660	1.9	2.2
157+760	2.2	2.4
157+860	2.0	2.5
157+960	2.2	2.1
158+060	1.7	2.0
158+160	1.8	1.7
158+260	2.1	2.0
158+360	2.5	2.8
158+460	3.7	3.8



KP	LHS Outer Lane	LHS Inner Lane
158+560	3.1	3.7
158+660	1.9	2.2
158+760	2.2	2.5
158+860	2.7	2.9
158+960	2.4	2.3
159+060	2.1	2.1
159+160	1.7	2.3
159+260	2.0	2.2
159+360	2.5	2.6
159+460	2.2	2.2
159+560	2.4	3.0
159+660	2.0	2.6
159+760	2.0	2.0
159+860	1.8	2.5
159+960	2.0	2.4
160+060	2.2	2.5
160+160	2.7	2.2
160+260	2.7	2.3
160+360	2.0	2.4
160+460	2.4	2.4
160+560	2.3	2.4
160+660	1.6	3.1
160+760	2.0	2.0
160+860	2.1	2.4
160+960	2.0	2.4
161+060	2.0	2.2
161+160	2.2	2.7
161+260	1.9	2.1
161+360	2.5	2.6
161+460	2.1	2.3
161+560	2.8	2.7
161+660	2.1	2.3
161+760	4.8	5.3
161+860	4.0	5.0
161+960	4.5	6.9
162+060	4.0	5.2
162+160	4.1	5.0
162+260	3.8	4.7
162+360	3.1	4.3
162+460	3.4	5.1
162+560	4.2	4.3
162+660	3.7	3.7
162+760	3.4	3.4
162+860	2.7	2.6
162+960	2.0	1.7
163+060	1.6	1.7

KP	LHS Outer Lane	LHS Inner Lane
163+160	2.1	2.6
163+260	1.8	2.3
163+360	2.0	2.2
163+460	2.0	1.8
163+560	2.4	2.2
163+660	2.0	2.2
163+760	1.7	1.9
163+860	2.1	2.5
163+960	2.0	2.1
164+060	2.0	2.5
164+160	2.4	2.1
164+260	2.5	2.5
164+360	2.0	1.7
164+460	2.8	2.1
164+560	1.9	2.4
164+660	2.5	2.4
164+760	2.1	2.4
164+860	2.1	2.1
164+960	1.8	2.2
165+060	2.2	2.2
165+160	1.8	2.1
165+260	1.7	1.8
165+360	2.0	2.1
165+460	3.4	3.8
165+560	2.4	2.9
165+660	2.5	2.5
165+760	1.6	2.0
165+860	1.7	1.8
165+960	2.3	2.4
166+060	2.0	2.4
166+160	1.8	2.0
166+260	2.3	2.1
166+360	2.2	2.1
166+460	2.1	2.4
166+560	2.3	2.7
166+660	3.1	4.8
166+760	1.9	1.9
166+860	2.2	2.4
166+960	2.0	2.1
167+060	2.3	2.4
167+160	3.4	4.0
167+260	3.5	2.9
167+360	1.7	1.7
167+460	2.3	2.3
167+560	1.7	2.0
167+660	2.0	2.7

KP	LHS Outer Lane	LHS Inner Lane
167+760	1.9	1.9
167+860	2.3	2.2
167+960	2.5	1.9
168+060	1.6	1.6
168+160	2.1	2.1
168+260	2.8	3.4
168+360	2.2	2.2
168+460	1.9	2.1
168+560	1.7	2.2
168+660	1.5	1.7
168+760	1.9	1.9
168+860	2.5	2.1
168+960	1.7	1.9
169+060	1.9	2.5
169+160	2.2	2.2
169+260	2.4	2.5
169+360	2.1	2.5
169+460	1.9	1.9
169+560	2.5	2.0
169+660	2.0	2.1
169+760	4.8	4.1
169+860	3.3	3.1
169+960	2.4	3.1
170+060	1.9	2.5
170+160	2.2	2.1
170+260	2.4	2.3
170+360	2.2	2.3
170+460	2.2	2.2
170+560	2.1	2.3
170+660	2.2	2.5
170+760	1.9	1.9
170+860	2.8	3.5
170+960	2.2	2.8
171+060	1.7	2.1
171+160	1.6	3.2
171+260	1.8	2.1
171+360	1.6	1.8
171+460	1.5	2.1
171+560	2.4	2.2
171+660	2.1	2.2
171+760	2.1	2.8
171+860	1.9	2.0
171+960	1.9	1.9
172+060	2.1	2.2
172+160	1.7	2.2
172+260	1.8	2.3

KP	LHS Outer Lane	LHS Inner Lane
172+360	1.8	2.1
172+460	1.7	1.8
172+560	2.4	2.0
172+660	1.9	2.5
172+760	2.1	2.2
172+860	2.1	2.5
172+960	1.9	2.5
173+060	1.7	2.0
173+160	2.1	2.3
173+260	2.1	2.8
173+360	2.1	2.2
173+460	2.1	2.6
173+560	2.2	2.0
173+660	2.2	2.1
173+760	2.1	2.8
173+860	1.8	2.2
173+960	3.1	2.2
174+060	3.0	2.3
174+160	2.2	2.4
174+260	2.1	3.3
174+360	2.0	2.6
174+460	2.1	2.6
174+560	2.4	2.3
174+660	2.1	2.2
174+760	2.2	2.4
174+860	1.9	2.4
174+960	2.0	2.1
175+060	2.3	2.2
175+160	2.2	2.4
175+260	2.2	2.4
175+360	2.6	2.2
175+460	2.0	2.6
175+560	2.3	2.5
175+660	1.7	2.4
175+760	2.1	2.3
175+860	2.0	2.3
175+960	1.9	3.0
176+060	1.9	2.3
176+160	1.7	2.4
176+260	2.1	2.1
176+360	2.3	2.7
176+460	1.9	2.3
176+560	1.9	2.7
176+660	2.6	2.8
176+760	1.9	2.3
176+860	1.9	2.2

KP	LHS Outer Lane	LHS Inner Lane
176+960	2.6	2.1
177+060	1.9	2.0
177+160	1.9	2.0
177+260	1.9	2.4
177+360	2.0	2.1
177+460	2.3	2.6
177+560	4.6	2.6
177+660	2.2	2.8
177+760	1.9	2.0
177+860	1.8	4.3
177+960	1.9	2.1
178+060	2.1	2.2
178+160	2.1	1.9
178+260	2.2	2.4
178+360	2.6	2.2
178+460	2.0	2.1
178+560	2.2	2.8
178+660	2.3	2.1
178+760	2.3	2.6
178+860	2.0	2.8
178+960	1.9	2.2
179+060	2.4	2.4
179+160	2.2	2.4
179+260	1.9	1.9
179+360	1.8	2.0
179+460	2.0	2.0
179+560	3.5	2.0
179+660	4.0	2.0
179+760	3.0	3.4
179+860	1.8	4.1
179+960	2.2	4.3
180+060	1.7	2.7
180+160	1.7	2.4
180+260	2.3	2.3
180+360	2.5	1.7
180+460	2.0	2.3
180+560	2.1	1.9
180+660	1.5	2.4
180+760	2.0	2.2
180+860	1.9	1.7
180+960	1.8	2.1
181+060	2.2	2.0
181+160	2.2	2.2
181+260	2.8	2.1
181+360	2.3	2.3
181+460	2.4	2.0

KP	LHS Outer Lane	LHS Inner Lane
181+560	2.3	2.2
181+660	1.8	2.1
181+760	2.3	2.5
181+860	1.7	1.9
181+960	2.1	2.0
182+060	2.1	1.8
182+160	2.1	2.3
182+260	2.3	2.1
182+360	2.3	1.9
182+460	2.1	2.0
182+560	2.3	2.4
182+660	2.1	2.3
182+760	2.1	2.4
182+860	2.3	2.7
182+960	2.4	2.6
183+060	2.1	2.7
183+160	2.2	2.5
183+260	1.9	2.6
183+360	2.4	2.4
183+460	2.1	2.9
183+560	1.8	2.1
183+660	1.7	2.7
183+760	2.1	2.1
183+860	2.0	2.2
183+960	1.9	1.9
184+060	1.7	2.3
184+160	2.1	2.1
184+260	2.2	2.1
184+360	1.9	2.1
184+460	2.2	2.0
184+560	1.9	2.6
184+660	1.7	2.0
184+760	1.7	2.3
184+860	2.8	2.3
184+960	2.0	2.1
185+060	2.2	2.5
185+160	1.9	2.2
185+260	2.4	2.8
185+360	2.4	1.7
185+460	2.1	1.7
185+560	2.0	2.5
185+660	3.5	2.1
185+760	2.9	2.2
185+860	1.7	3.1
185+960	2.6	3.8
186+060	2.2	2.5

KP	LHS Outer Lane	LHS Inner Lane
186+160	2.4	2.3
186+260	2.1	2.3
186+360	2.4	1.9
186+460	2.7	2.3
186+560	2.3	2.2
186+660	2.0	2.1
186+760	2.3	1.9
186+860	1.9	1.9
186+960	2.9	1.9
187+060	3.9	1.5
187+160	3.2	2.2
187+260	2.4	3.6
187+360	2.0	3.9
187+460	2.1	2.3
187+560	2.6	2.1
187+660	1.9	2.3
187+760	1.3	2.3
187+860	2.0	2.0
187+960	1.4	1.8
188+060	2.4	2.2
188+160	2.3	2.7
188+260	1.9	2.6
188+360	4.1	2.5
188+460	2.6	2.1
188+560	3.1	3.0
188+660	2.9	3.2
188+760	3.0	2.1
188+860	1.8	2.2
188+960	1.9	2.8
189+060	2.2	2.1
189+160	1.7	2.1
189+260	1.8	2.2
189+360	1.8	2.4
189+460	2.1	2.0
189+560	2.4	2.0
189+660	1.6	2.2
189+760	1.9	2.3
189+860	1.8	2.8
189+960	2.6	2.2
190+060	2.5	2.1
190+160	3.3	2.8
190+260	2.7	2.0
190+360	2.3	2.6
190+460	2.1	2.3
190+560	1.9	2.3
190+660	1.9	2.4

KP	LHS Outer Lane	LHS Inner Lane
190+760	1.5	1.9
190+860	1.7	2.1
190+960	1.4	2.1
191+060	2.2	1.7
191+160	2.9	1.9
191+260	2.0	2.0
191+360	4.7	2.4
191+460	3.2	2.5
191+560	2.0	2.1
191+660	2.0	2.9
191+760	2.1	2.3
191+860	2.2	2.1
191+960	2.0	2.2
192+060	2.5	2.2
192+160	2.6	2.7
192+260	2.7	2.0
192+360	2.5	1.9
192+460	2.2	2.2
192+560	2.6	1.9
192+660	2.1	2.0
192+760	1.6	2.4
192+860	2.3	2.7
192+960	2.2	2.1
193+060	1.9	2.3
193+160	2.2	1.9
193+260	2.4	1.7
193+360	2.0	1.7
193+460	2.1	2.7
193+560	2.1	2.4
193+660	2.4	2.1
193+760	2.2	2.0
193+860	2.0	2.2
193+960	3.4	2.1
194+060	3.1	1.9
194+160	1.6	2.8
194+260	2.5	3.7
194+360	2.0	2.3
194+460	2.8	2.1
194+560	2.1	2.6
194+660	2.2	2.4
194+760	2.5	2.5
194+860	2.4	2.3
194+960	3.5	2.3
195+060	3.2	3.1
195+160	2.7	2.7
195+260	2.8	3.2



KP	LHS Outer Lane	LHS Inner Lane
195+360	2.9	2.3
195+460	3.0	2.5
195+560	4.0	2.6
195+660	2.4	3.0
195+760	2.7	2.7
195+860	3.3	2.5
195+960	3.0	2.1
196+060	2.4	3.0
196+160	2.6	2.8
196+260	3.2	2.1
196+360	3.6	2.2
196+460	3.9	2.2
196+560	2.3	2.5
196+660	2.3	3.4
196+760	2.3	2.2
196+860	2.2	2.3
196+960	2.2	2.0
197+060	2.1	2.0
197+160	1.8	2.1
197+260	2.8	2.3
197+360	2.2	2.1
197+460	2.1	3.4
197+560	2.4	2.1
197+660	2.9	2.0
197+760	2.6	2.0
197+860	2.1	2.0
197+960	1.4	2.6
198+060	1.7	2.0
198+160	2.2	2.2
198+260	2.5	1.9
198+360	2.6	1.8
198+460	2.3	2.4
198+560	1.8	3.4
198+660	2.5	2.3
198+760	2.0	1.8
198+860	2.3	2.1
198+960	2.1	2.2
199+060	2.0	2.2
199+160	1.8	2.8
199+260	2.0	2.3
199+360	2.0	2.1
199+460	2.2	2.0
199+560	2.2	2.3
199+660	4.2	2.2
199+760	2.1	2.4
199+860	2.1	3.1

KP	LHS Outer Lane	LHS Inner Lane
199+960	1.8	3.4
200+060	1.4	2.0
200+160	2.3	1.9
200+260	2.1	1.8
200+360	2.7	1.9
200+460	2.5	2.4
200+560	1.8	1.7
200+660	1.9	2.5
200+760	2.4	2.2
200+860	2.7	1.6
200+960	2.4	1.8
201+060	2.8	2.1
201+160	2.2	2.5
201+260	2.8	2.2
201+360	2.0	2.2
201+460	3.0	2.1
201+560	3.1	2.0
201+660	1.3	3.0
201+760	2.0	3.6
201+860	2.0	2.0
201+960	1.8	1.6
202+060	2.3	1.5
202+160	2.0	1.3
202+260	2.1	2.1
202+360	2.2	2.1
202+460	2.2	1.7
202+560	2.1	2.1
202+660	1.8	1.6
202+760	2.0	2.0
202+860	2.1	2.5
202+960	2.2	2.4
203+060	2.0	2.1
203+160	3.9	2.4
203+260	3.5	2.8
203+360	3.7	3.4
203+460	3.0	3.6
203+560	3.6	3.5
203+660	4.3	3.9
203+760	4.4	4.4
203+860	2.8	4.4
203+960	2.1	4.3
204+060	2.0	3.7
204+160	3.6	2.4
204+260	1.8	2.6
204+360	2.9	3.3
204+460	2.7	3.3

KP	LHS Outer Lane	LHS Inner Lane
204+560	1.6	2.2
204+660	2.3	6.4
204+760	1.7	2.0
204+860	2.2	1.9
204+960	1.8	2.0
205+060	1.8	2.0
205+160	1.9	1.9
205+260	2.3	2.0
205+360	1.9	2.4
205+460	1.9	1.7
205+560	2.0	1.4
205+660	2.0	2.2
205+760	1.8	2.3
205+860	2.4	1.8
205+960	3.4	2.1
206+060	2.6	2.3
206+160	1.8	3.0
206+260	1.9	3.3
206+360	2.0	1.9
206+460	2.5	1.4
206+560	2.3	1.6
206+660	2.1	2.1
206+760	1.6	1.7
206+860	2.1	1.9
206+960	2.3	1.9
207+060	1.8	1.8
207+160	2.2	1.8
207+260	2.3	1.8
207+360	2.7	1.8
207+460	3.2	1.8
207+560	2.3	1.5
207+660	2.4	2.1
207+760	2.4	1.6
207+860	2.1	2.3
207+960	2.7	2.5
208+060	1.7	2.3
208+160	4.5	2.0
208+260	2.7	1.8
208+360	1.8	3.7
208+460	2.2	3.6
208+560	1.9	1.9
208+660	2.1	2.0
208+760	3.1	2.5
208+860	1.9	2.1
208+960	2.0	2.6
209+060	1.9	2.4

KP	LHS Outer Lane	LHS Inner Lane
209+160	6.2	2.0
209+260	2.1	2.5
209+360	4.0	4.0
209+460	2.6	4.4
209+560	2.3	3.6
209+660	1.7	5.9
209+760	2.0	3.7
209+860	2.7	2.1
209+960	2.7	1.8
210+060	2.0	4.0
210+160	3.8	2.5
210+260	3.9	2.9
210+360	1.8	3.0
210+460	2.3	4.2
210+560	2.4	2.6
210+660	3.3	2.4
210+760	3.6	2.8
210+860	3.2	2.9
210+960	2.3	2.4
210+990	2.6	2.2

Table 1. LHS IRI Results

## INTERNATIONAL ROUGHNESS INDEX (IRI) - RHS

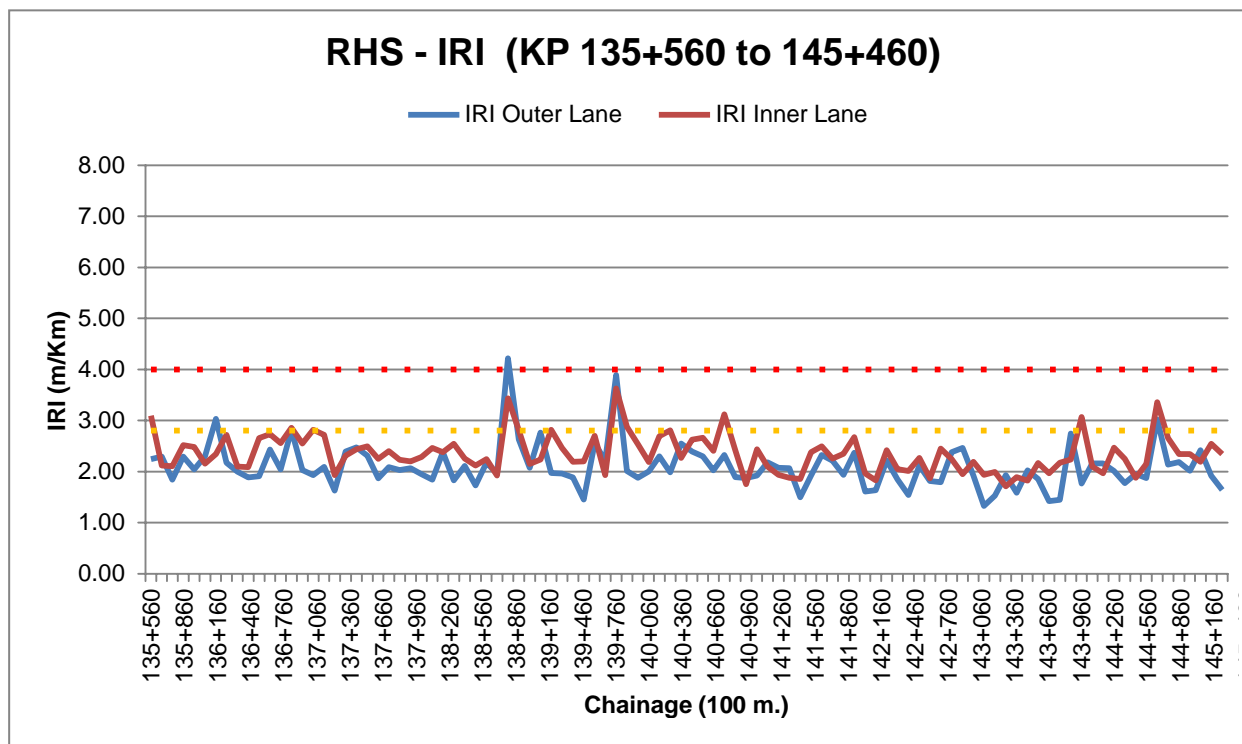


Figure 10. RHS - IRI (KP 135+560 to KP 145+460)

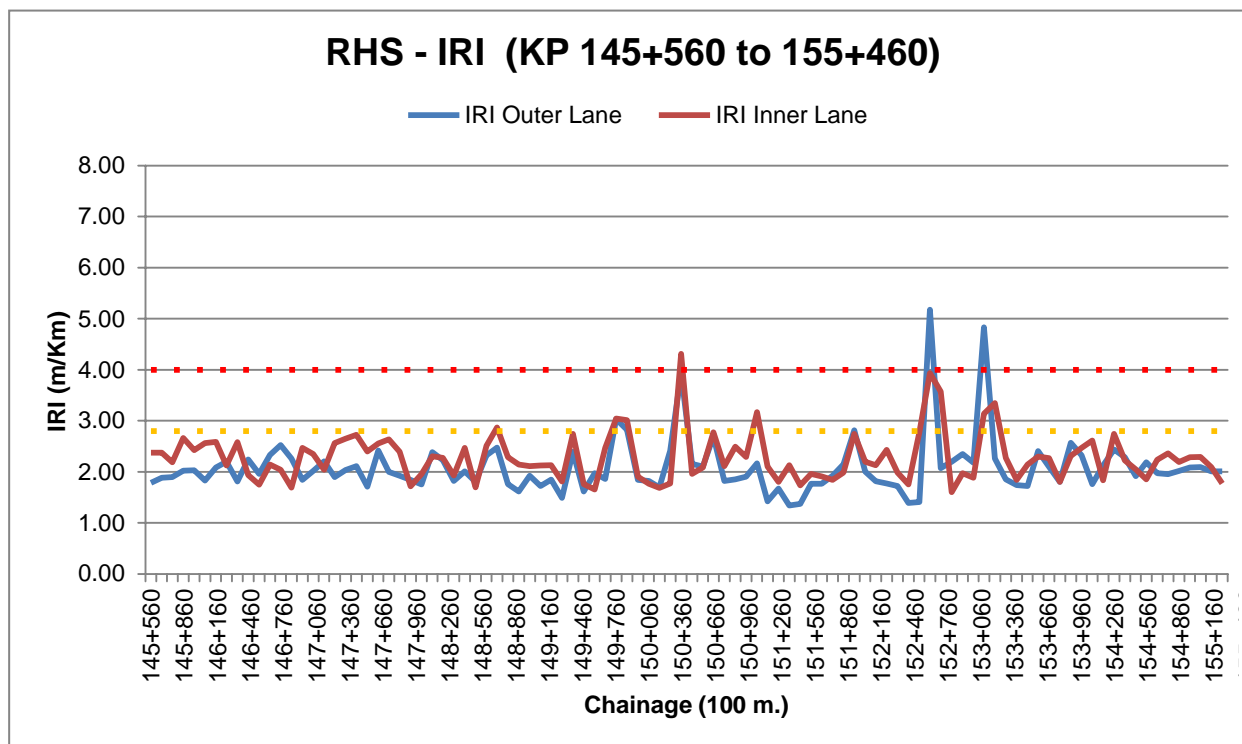


Figure 11. RHS - IRI (KP 145+560 to KP 155+460)

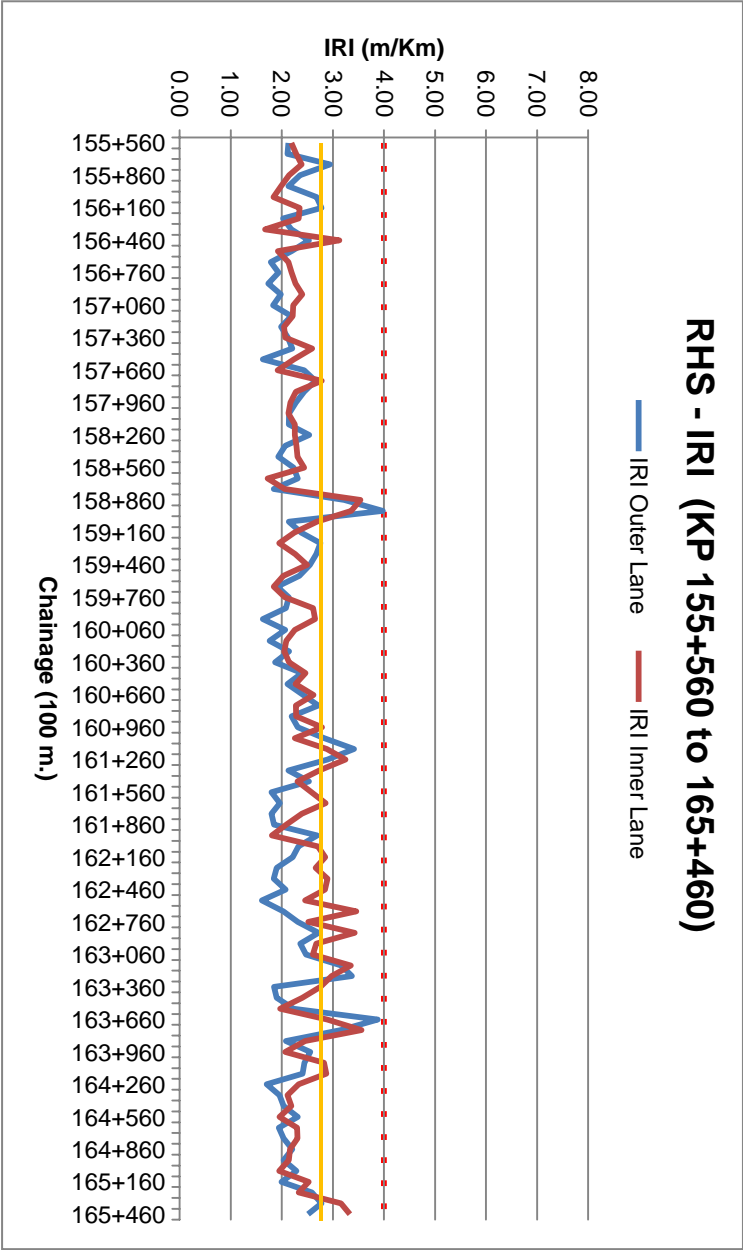


Figure 12. RHS - IRI (KP 155+560 to KP 165+460)

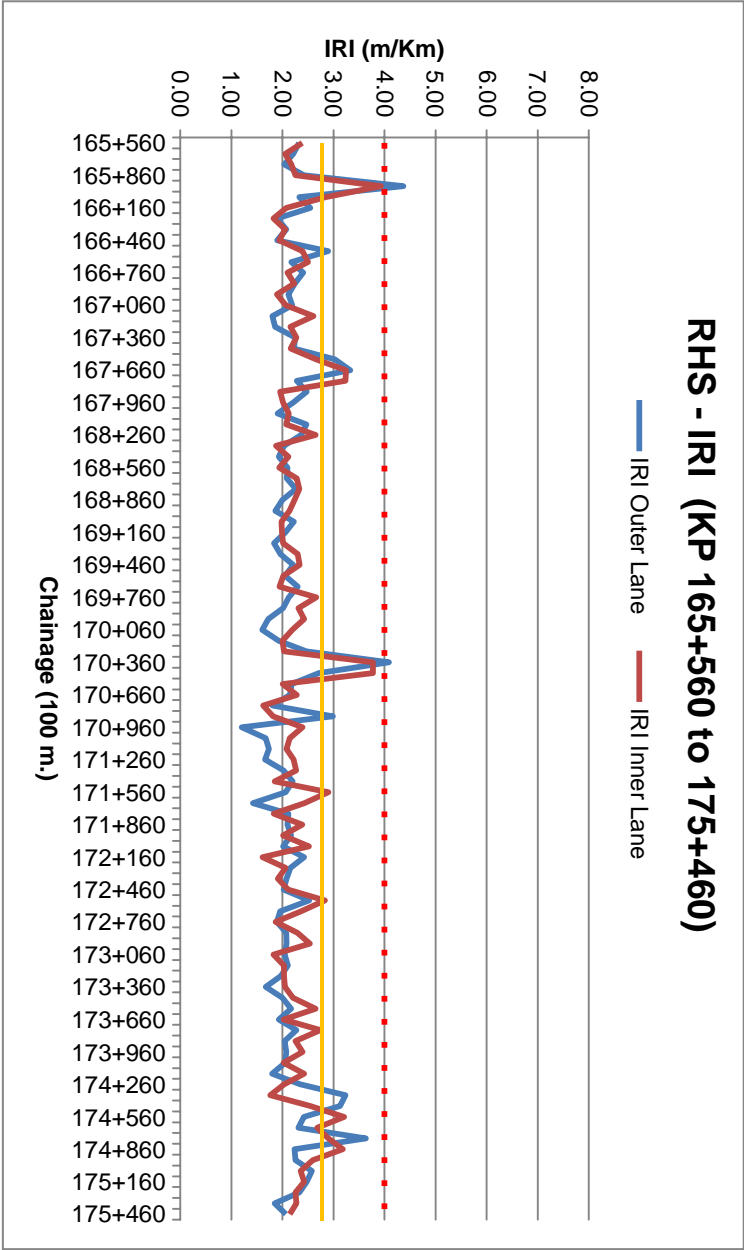


Figure 13. RHS - IRI (KP 165+560 to KP 175+460)

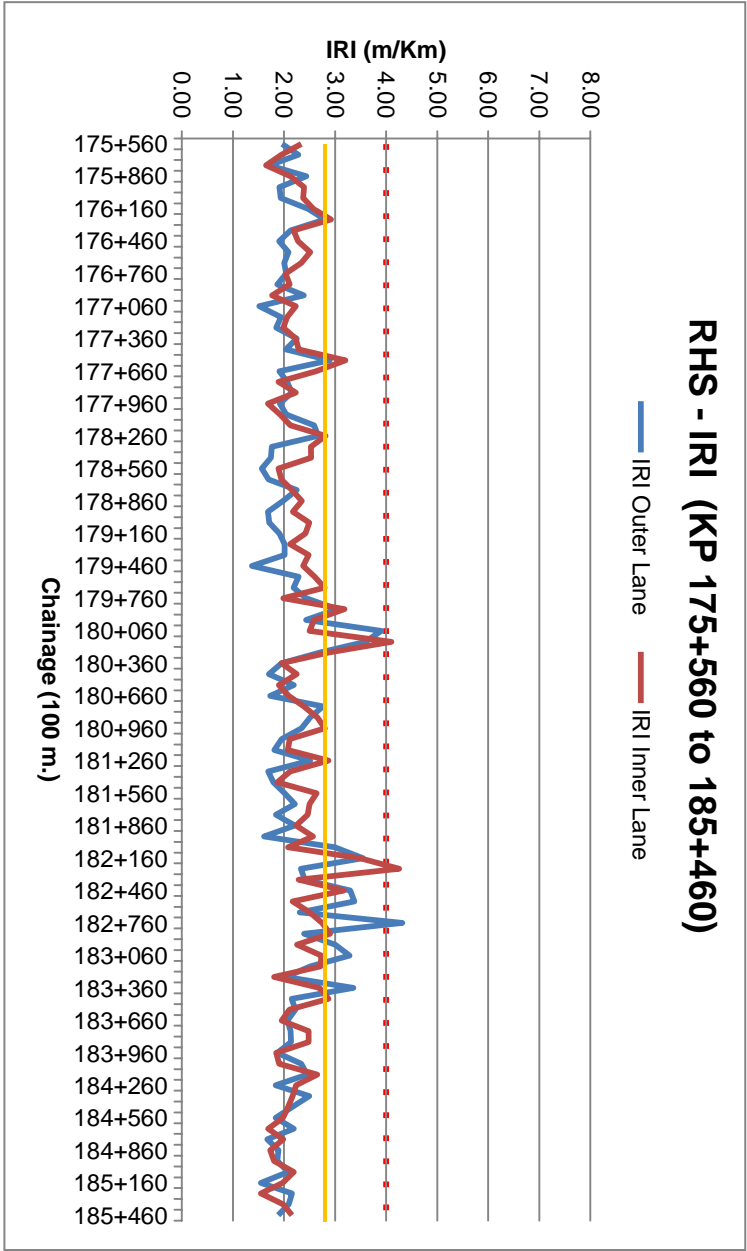


Figure 14. RHS - IRI (KP 175+560 to KP 185+460)

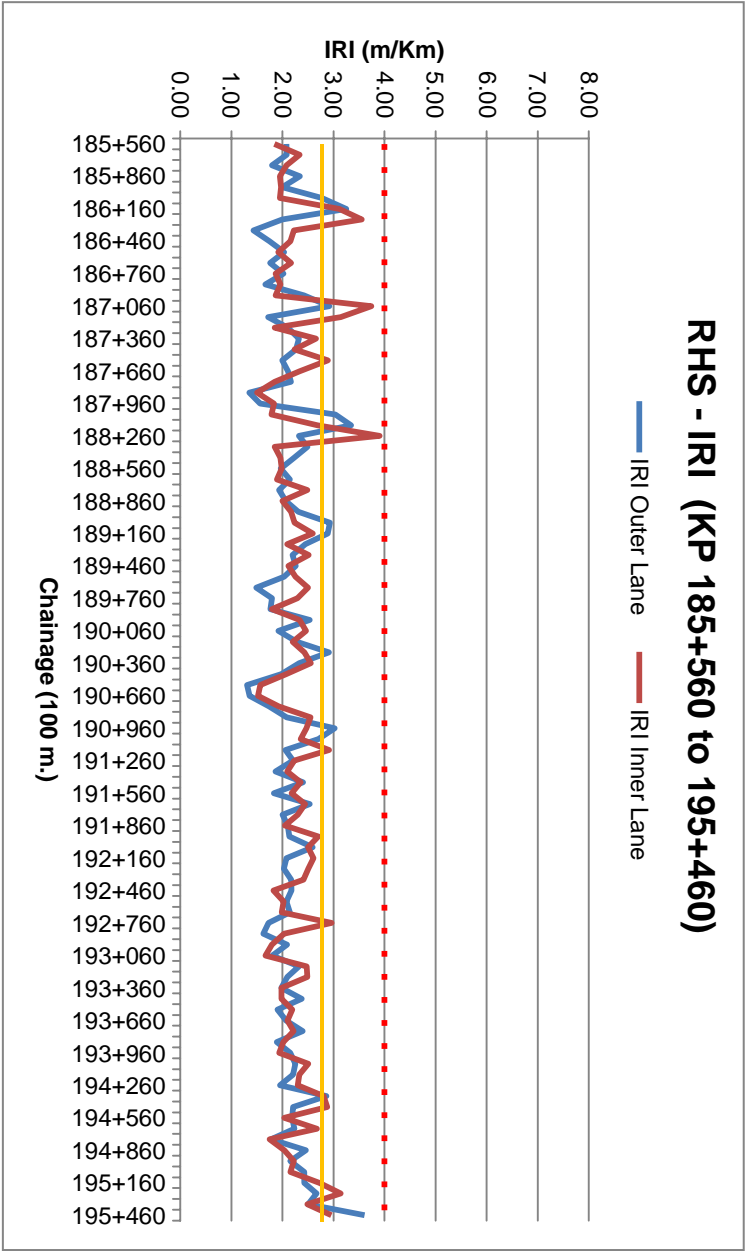


Figure 15. RHS - IRI (KP 185+560 to KP 195+460)

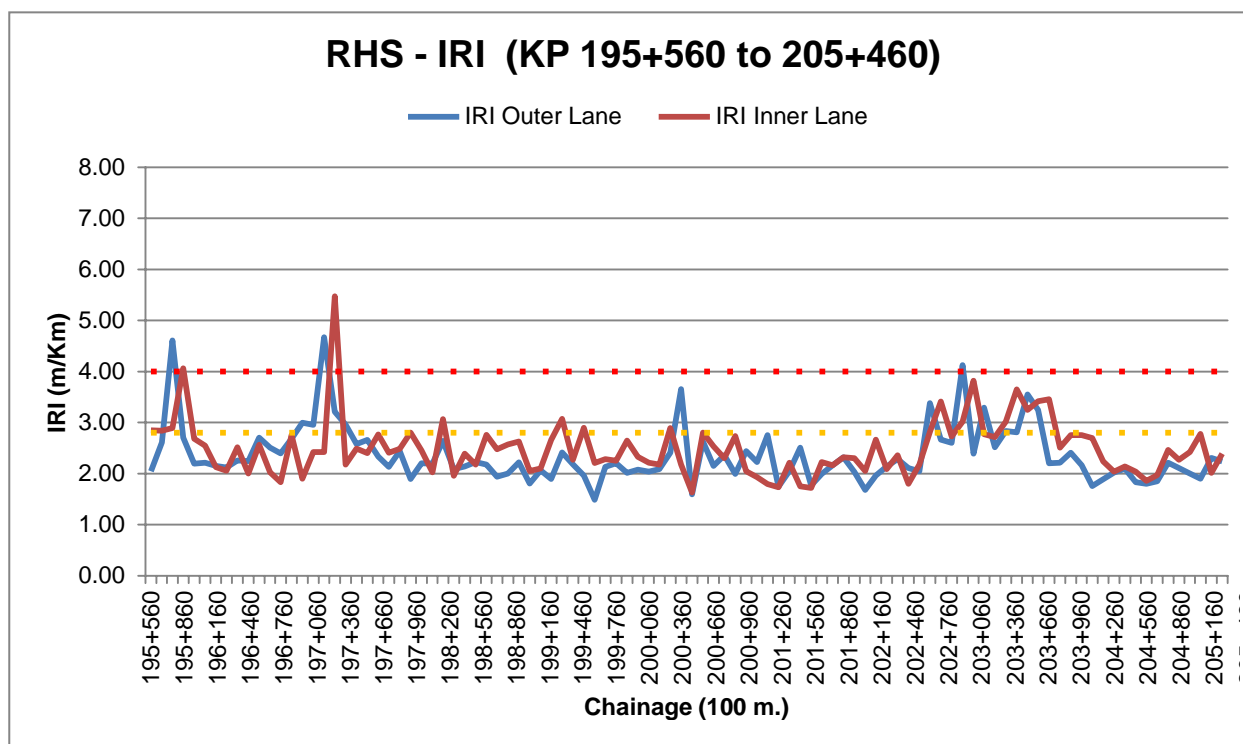


Figure 16. RHS - IRI (KP 195+560 to KP 205+460)

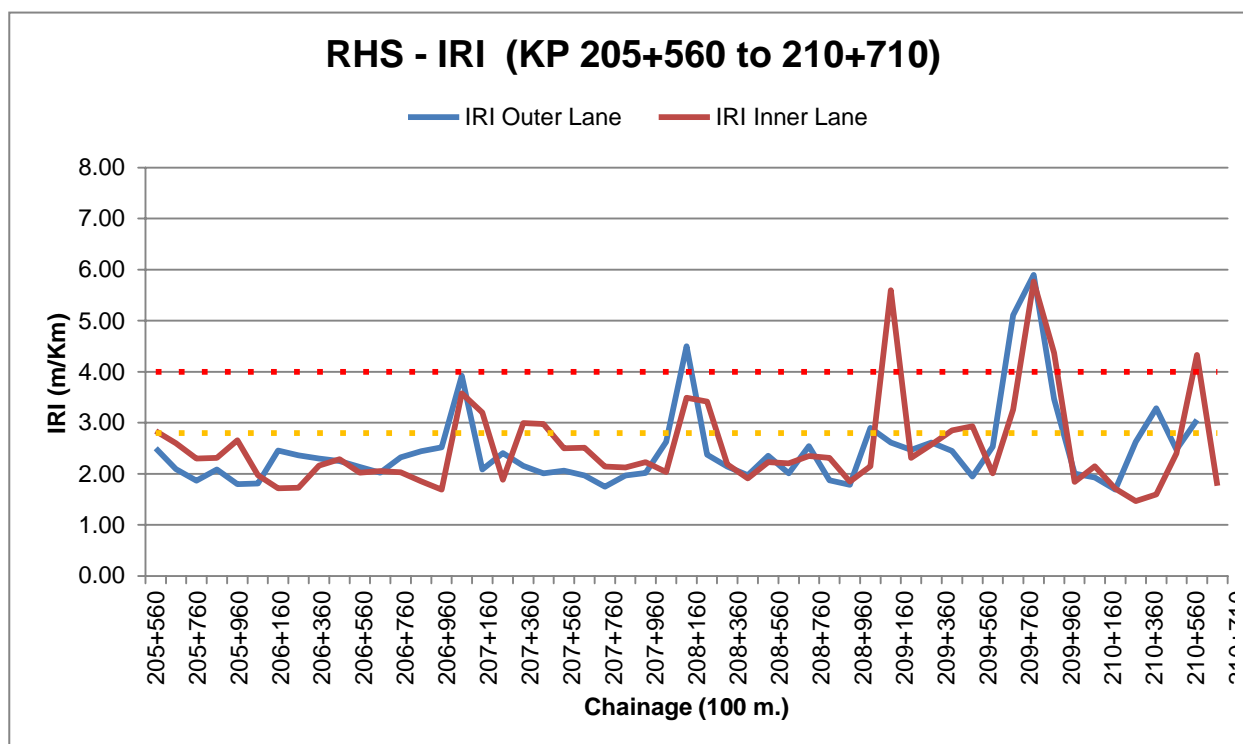


Figure 17. RHS - IRI (KP 205+560 to KP 210+710)



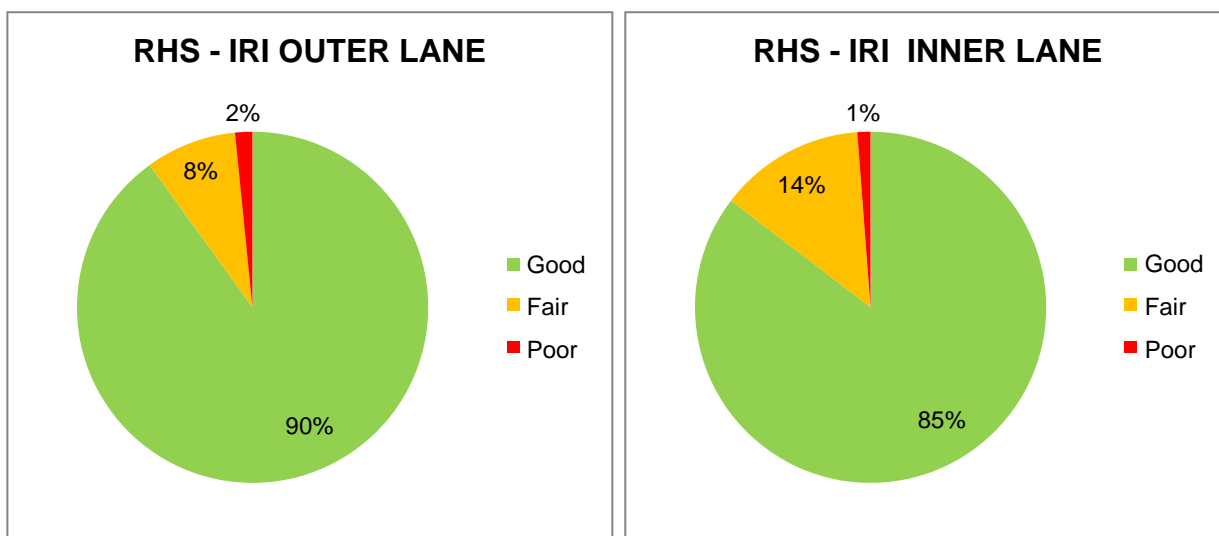


Figure 18. IRI RHS Outer and Inner Lanes Results

KP	RHS Outer Lane	RHS Inner Lane
135+560	2.2	3.1
135+660	2.3	2.1
135+760	1.8	2.1
135+860	2.3	2.5
135+960	2.0	2.5
136+060	2.3	2.2
136+160	3.0	2.3
136+260	2.2	2.7
136+360	2.0	2.1
136+460	1.9	2.1
136+560	1.9	2.7
136+660	2.4	2.7
136+760	2.0	2.6
136+860	2.8	2.9
136+960	2.0	2.6
137+060	1.9	2.8
137+160	2.1	2.7
137+260	1.6	1.9
137+360	2.4	2.3
137+460	2.5	2.4
137+560	2.3	2.5
137+660	1.9	2.3
137+760	2.1	2.4
137+860	2.0	2.2
137+960	2.1	2.2
138+060	1.9	2.3
138+160	1.8	2.5

KP	RHS Outer Lane	RHS Inner Lane
138+260	2.4	2.4
138+360	1.8	2.5
138+460	2.1	2.3
138+560	1.7	2.1
138+660	2.2	2.2
138+760	2.0	1.9
138+860	4.2	3.4
138+960	2.6	2.8
139+060	2.1	2.2
139+160	2.8	2.2
139+260	2.0	2.8
139+360	2.0	2.5
139+460	1.9	2.2
139+560	1.5	2.2
139+660	2.6	2.7
139+760	2.2	1.9
139+860	3.9	3.6
139+960	2.0	2.9
140+060	1.9	2.5
140+160	2.0	2.2
140+260	2.3	2.7
140+360	2.0	2.8
140+460	2.6	2.3
140+560	2.4	2.6
140+660	2.3	2.7
140+760	2.0	2.4
140+860	2.3	3.1
140+960	1.9	2.4
141+060	1.9	1.8
141+160	1.9	2.4
141+260	2.2	2.1
141+360	2.1	1.9
141+460	2.1	1.9
141+560	1.5	1.9
141+660	1.9	2.4
141+760	2.3	2.5
141+860	2.2	2.3
141+960	1.9	2.4
142+060	2.4	2.7
142+160	1.6	2.0
142+260	1.6	1.8
142+360	2.2	2.4
142+460	1.8	2.0
142+560	1.5	2.0
142+660	2.1	2.3
142+760	1.8	1.9

KP	RHS Outer Lane	RHS Inner Lane
142+860	1.8	2.5
142+960	2.4	2.2
143+060	2.5	1.9
143+160	1.9	2.2
143+260	1.3	1.9
143+360	1.5	2.0
143+460	1.9	1.7
143+560	1.6	1.9
143+660	2.0	1.8
143+760	1.9	2.2
143+860	1.4	2.0
143+960	1.4	2.2
144+060	2.7	2.2
144+160	1.8	3.1
144+260	2.2	2.1
144+360	2.2	2.0
144+460	2.0	2.5
144+560	1.8	2.2
144+660	2.0	1.9
144+760	1.9	2.2
144+860	3.0	3.4
144+960	2.1	2.7
145+060	2.2	2.3
145+160	2.0	2.3
145+260	2.4	2.2
145+360	1.9	2.5
145+460	1.6	2.3
145+560	1.8	2.4
145+660	1.9	2.4
145+760	1.9	2.2
145+860	2.0	2.7
145+960	2.0	2.4
146+060	1.8	2.6
146+160	2.1	2.6
146+260	2.2	2.1
146+360	1.8	2.6
146+460	2.2	1.9
146+560	2.0	1.8
146+660	2.3	2.1
146+760	2.5	2.0
146+860	2.3	1.7
146+960	1.8	2.5
147+060	2.0	2.3
147+160	2.2	2.0
147+260	1.9	2.6
147+360	2.0	2.7

KP	RHS Outer Lane	RHS Inner Lane
147+460	2.1	2.7
147+560	1.7	2.4
147+660	2.4	2.6
147+760	2.0	2.6
147+860	1.9	2.4
147+960	1.8	1.7
148+060	1.8	2.0
148+160	2.4	2.3
148+260	2.2	2.3
148+360	1.8	1.9
148+460	2.0	2.5
148+560	1.8	1.7
148+660	2.3	2.5
148+760	2.5	2.9
148+860	1.8	2.3
148+960	1.6	2.1
149+060	1.9	2.1
149+160	1.7	2.1
149+260	1.8	2.1
149+360	1.5	1.8
149+460	2.4	2.7
149+560	1.6	1.8
149+660	2.0	1.7
149+760	1.9	2.5
149+860	3.0	3.0
149+960	2.8	3.0
150+060	1.8	1.9
150+160	1.8	1.8
150+260	1.7	1.7
150+360	2.4	1.8
150+460	3.9	4.3
150+560	2.2	2.0
150+660	2.1	2.1
150+760	2.7	2.8
150+860	1.8	2.1
150+960	1.9	2.5
151+060	1.9	2.3
151+160	2.2	3.2
151+260	1.4	2.1
151+360	1.7	1.8
151+460	1.3	2.1
151+560	1.4	1.7
151+660	1.8	2.0
151+760	1.8	1.9
151+860	1.9	1.8
151+960	2.1	2.0

KP	RHS Outer Lane	RHS Inner Lane
152+060	2.8	2.7
152+160	2.0	2.2
152+260	1.8	2.1
152+360	1.8	2.4
152+460	1.7	2.0
152+560	1.4	1.8
152+660	1.4	2.8
152+760	5.2	3.9
152+860	2.1	3.6
152+960	2.2	1.6
153+060	2.4	2.0
153+160	2.2	1.9
153+260	4.8	3.1
153+360	2.3	3.3
153+460	1.9	2.3
153+560	1.7	1.8
153+660	1.7	2.1
153+760	2.4	2.3
153+860	2.1	2.3
153+960	1.8	1.8
154+060	2.6	2.3
154+160	2.3	2.5
154+260	1.8	2.6
154+360	2.1	1.8
154+460	2.4	2.7
154+560	2.3	2.2
154+660	1.9	2.0
154+760	2.2	1.9
154+860	2.0	2.2
154+960	2.0	2.4
155+060	2.0	2.2
155+160	2.1	2.3
155+260	2.1	2.3
155+360	2.0	2.1
155+460	2.0	1.8
155+560	2.1	2.2
155+660	2.1	2.3
155+760	2.9	2.4
155+860	2.4	2.1
155+960	2.1	2.0
156+060	2.7	1.8
156+160	2.8	2.3
156+260	2.0	2.3
156+360	2.2	1.7
156+460	2.5	3.1
156+560	2.2	1.9

KP	RHS Outer Lane	RHS Inner Lane
156+660	1.8	2.1
156+760	1.9	2.2
156+860	1.7	2.3
156+960	2.0	2.4
157+060	1.8	2.2
157+160	2.2	2.2
157+260	2.0	2.0
157+360	2.1	2.1
157+460	2.2	2.6
157+560	1.6	2.2
157+660	2.4	1.9
157+760	2.7	2.8
157+860	2.4	2.3
157+960	2.3	2.2
158+060	2.1	2.1
158+160	2.1	2.3
158+260	2.5	2.3
158+360	2.1	2.3
158+460	1.9	2.3
158+560	2.2	2.4
158+660	2.3	1.7
158+760	1.8	2.1
158+860	3.2	3.5
158+960	4.0	3.4
159+060	2.1	2.7
159+160	2.4	2.2
159+260	2.8	1.9
159+360	2.7	2.3
159+460	2.6	2.5
159+560	2.3	2.0
159+660	1.9	1.8
159+760	2.1	2.1
159+860	2.1	2.6
159+960	1.6	2.6
160+060	2.1	2.3
160+160	1.8	2.1
160+260	2.1	2.0
160+360	1.9	2.1
160+460	2.4	2.5
160+560	2.1	2.3
160+660	2.4	2.6
160+760	2.7	2.3
160+860	2.2	2.3
160+960	2.3	2.8
161+060	2.8	2.3
161+160	3.4	2.9

KP	RHS Outer Lane	RHS Inner Lane
161+260	2.9	3.2
161+360	2.1	2.7
161+460	2.5	2.3
161+560	1.8	2.6
161+660	2.0	2.9
161+760	1.8	2.4
161+860	1.9	2.1
161+960	2.7	1.8
162+060	2.3	2.7
162+160	2.2	2.9
162+260	1.9	2.7
162+360	1.8	2.9
162+460	2.1	2.8
162+560	1.6	2.5
162+660	2.0	3.5
162+760	2.3	2.5
162+860	2.7	3.4
162+960	2.4	2.7
163+060	2.5	2.6
163+160	3.2	3.4
163+260	3.4	3.0
163+360	1.8	2.8
163+460	1.9	2.4
163+560	2.2	2.0
163+660	3.9	2.9
163+760	3.2	3.6
163+860	2.1	2.5
163+960	2.6	2.1
164+060	2.4	2.8
164+160	2.4	2.9
164+260	1.7	2.3
164+360	2.0	2.1
164+460	2.0	2.2
164+560	2.3	2.0
164+660	1.9	2.3
164+760	2.0	2.3
164+860	2.2	2.2
164+960	2.0	2.1
165+060	2.3	2.0
165+160	2.0	2.5
165+260	2.6	2.3
165+360	2.8	3.2
165+460	2.5	3.3
165+560	2.3	2.4
165+660	2.2	2.1
165+760	2.0	2.2

KP	RHS Outer Lane	RHS Inner Lane
165+860	2.4	2.3
165+960	4.4	3.9
166+060	2.3	2.9
166+160	2.5	2.1
166+260	1.9	1.8
166+360	2.1	2.1
166+460	1.9	1.9
166+560	2.9	2.4
166+660	2.2	2.5
166+760	2.4	2.1
166+860	2.2	2.2
166+960	2.1	1.9
167+060	2.2	2.1
167+160	1.8	2.6
167+260	1.9	2.2
167+360	2.2	2.3
167+460	2.2	2.2
167+560	3.0	2.7
167+660	3.3	3.2
167+760	2.3	3.2
167+860	2.5	2.0
167+960	2.2	2.0
168+060	1.9	2.1
168+160	2.5	2.1
168+260	2.4	2.7
168+360	2.0	1.9
168+460	1.9	2.1
168+560	2.1	1.9
168+660	2.1	2.3
168+760	2.3	2.3
168+860	2.0	2.2
168+960	1.9	2.1
169+060	2.2	2.0
169+160	2.1	2.0
169+260	1.8	2.0
169+360	2.0	2.3
169+460	2.2	2.3
169+560	2.1	2.0
169+660	2.3	1.9
169+760	2.1	2.7
169+860	2.0	2.3
169+960	1.7	2.4
170+060	1.6	2.2
170+160	1.9	2.0
170+260	2.5	2.0
170+360	4.1	3.8



KP	RHS Outer Lane	RHS Inner Lane
170+460	2.7	3.8
170+560	2.2	2.0
170+660	2.2	2.3
170+760	1.8	1.6
170+860	3.0	1.8
170+960	1.2	2.4
171+060	1.7	2.1
171+160	1.7	2.1
171+260	1.7	2.2
171+360	2.0	2.3
171+460	2.2	1.8
171+560	2.1	2.9
171+660	1.4	2.4
171+760	2.1	1.8
171+860	2.1	2.4
171+960	2.2	2.0
172+060	2.0	2.5
172+160	2.4	1.6
172+260	2.2	2.1
172+360	2.1	1.9
172+460	2.0	2.1
172+560	2.5	2.8
172+660	2.0	2.4
172+760	1.9	1.9
172+860	2.1	2.3
172+960	2.1	2.5
173+060	2.0	1.8
173+160	2.1	2.0
173+260	2.0	2.0
173+360	1.7	2.0
173+460	2.0	2.2
173+560	2.2	2.7
173+660	1.9	2.0
173+760	2.3	2.7
173+860	2.0	2.3
173+960	2.1	2.4
174+060	2.1	2.0
174+160	1.8	2.4
174+260	2.3	2.0
174+360	3.2	1.8
174+460	3.1	2.5
174+560	2.4	3.2
174+660	2.3	2.7
174+760	3.6	2.9
174+860	2.2	3.2
174+960	2.3	2.6

KP	RHS Outer Lane	RHS Inner Lane
175+060	2.6	2.4
175+160	2.5	2.4
175+260	2.3	2.3
175+360	1.9	2.3
175+460	2.1	2.1
175+560	2.0	2.3
175+660	2.3	1.9
175+760	1.7	1.7
175+860	2.4	2.1
175+960	1.9	2.4
176+060	1.9	2.4
176+160	2.5	2.6
176+260	2.8	2.9
176+360	2.1	2.2
176+460	1.9	2.3
176+560	2.1	2.5
176+660	2.0	2.3
176+760	2.0	2.0
176+860	1.9	2.1
176+960	2.4	1.8
177+060	1.5	2.2
177+160	1.9	2.1
177+260	1.9	2.0
177+360	2.2	2.2
177+460	2.0	2.3
177+560	2.9	3.2
177+660	1.9	2.6
177+760	2.1	1.9
177+860	2.2	2.2
177+960	1.9	1.7
178+060	2.0	1.9
178+160	2.6	2.1
178+260	2.7	2.8
178+360	1.8	2.5
178+460	1.7	2.5
178+560	1.6	1.9
178+660	1.7	2.0
178+760	2.3	2.2
178+860	2.0	2.4
178+960	1.7	2.2
179+060	1.7	2.5
179+160	1.9	2.4
179+260	2.0	2.1
179+360	2.0	2.5
179+460	1.4	2.4
179+560	2.3	2.6

KP	RHS Outer Lane	RHS Inner Lane
179+660	2.2	2.8
179+760	2.4	2.0
179+860	3.0	3.2
179+960	2.4	2.6
180+060	3.9	2.5
180+160	3.6	4.1
180+260	2.7	2.9
180+360	2.0	2.0
180+460	1.7	2.3
180+560	2.2	1.9
180+660	1.7	2.1
180+760	2.8	2.4
180+860	2.5	2.6
180+960	2.3	2.8
181+060	2.0	2.1
181+160	1.8	2.1
181+260	2.5	2.9
181+360	1.7	2.1
181+460	1.8	1.9
181+560	2.0	2.6
181+660	2.2	2.5
181+760	1.8	2.5
181+860	2.2	2.2
181+960	1.6	2.6
182+060	3.0	2.1
182+160	3.5	3.5
182+260	2.3	4.3
182+360	2.4	2.3
182+460	3.3	3.2
182+560	3.4	2.2
182+660	2.3	2.5
182+760	4.3	2.7
182+860	2.4	2.9
182+960	3.0	2.3
183+060	3.3	2.7
183+160	2.5	2.7
183+260	2.0	1.8
183+360	3.4	2.7
183+460	2.2	2.9
183+560	2.2	2.1
183+660	2.1	2.0
183+760	2.1	2.5
183+860	2.1	2.5
183+960	1.9	1.8
184+060	2.3	1.9
184+160	2.4	2.6

KP	RHS Outer Lane	RHS Inner Lane
184+260	1.8	2.2
184+360	2.5	2.2
184+460	2.2	2.1
184+560	1.8	2.0
184+660	2.2	1.7
184+760	1.7	2.0
184+860	1.9	1.7
184+960	1.9	1.8
185+060	2.1	2.2
185+160	1.6	2.0
185+260	2.2	1.5
185+360	2.1	2.0
185+460	1.9	2.2
185+560	2.1	1.8
185+660	2.1	2.3
185+760	1.8	2.1
185+860	2.3	1.9
185+960	2.0	2.0
186+060	2.8	1.9
186+160	3.3	3.1
186+260	2.0	3.6
186+360	1.4	2.2
186+460	1.7	2.2
186+560	2.0	1.9
186+660	1.8	2.2
186+760	2.0	1.9
186+860	1.7	2.0
186+960	2.4	1.9
187+060	2.9	3.7
187+160	1.7	3.1
187+260	2.1	1.8
187+360	2.3	2.7
187+460	2.3	2.2
187+560	2.0	2.9
187+660	2.1	2.3
187+760	2.2	1.9
187+860	1.4	1.5
187+960	1.6	1.8
188+060	3.0	1.8
188+160	3.3	2.7
188+260	2.3	3.9
188+360	2.5	1.8
188+460	2.2	2.0
188+560	2.0	2.0
188+660	2.2	1.9
188+760	1.9	2.5

KP	RHS Outer Lane	RHS Inner Lane
188+860	2.1	2.0
188+960	2.3	2.2
189+060	2.9	2.2
189+160	2.9	2.6
189+260	2.5	2.1
189+360	2.2	2.5
189+460	2.3	2.1
189+560	2.0	2.3
189+660	1.5	2.5
189+760	1.8	2.3
189+860	1.8	1.8
189+960	2.5	2.3
190+060	1.9	2.5
190+160	2.3	2.2
190+260	2.9	2.4
190+360	2.3	2.6
190+460	2.0	2.1
190+560	1.3	1.6
190+660	1.4	1.5
190+760	1.7	1.9
190+860	2.1	2.5
190+960	3.0	2.5
191+060	2.7	2.4
191+160	2.1	2.9
191+260	2.2	2.2
191+360	1.9	2.1
191+460	2.4	2.4
191+560	1.8	2.2
191+660	2.5	2.4
191+760	2.0	2.3
191+860	2.1	2.0
191+960	2.1	2.7
192+060	2.6	2.5
192+160	2.1	2.6
192+260	2.0	2.5
192+360	2.2	2.4
192+460	2.2	1.8
192+560	2.1	2.0
192+660	2.1	2.0
192+760	1.7	3.0
192+860	1.6	2.0
192+960	2.1	1.8
193+060	1.8	1.7
193+160	2.3	2.5
193+260	2.1	2.5
193+360	2.0	2.0

KP	RHS Outer Lane	RHS Inner Lane
193+460	2.4	2.0
193+560	1.9	2.2
193+660	2.1	2.1
193+760	2.4	2.2
193+860	1.9	2.0
193+960	2.2	1.9
194+060	2.3	2.5
194+160	2.2	2.3
194+260	2.0	2.3
194+360	2.9	2.8
194+460	2.2	2.9
194+560	2.2	2.0
194+660	2.2	2.7
194+760	1.8	1.7
194+860	2.5	2.0
194+960	2.2	2.2
195+060	2.4	2.2
195+160	2.4	2.7
195+260	2.7	3.1
195+360	2.5	2.5
195+460	3.6	3.0
195+560	2.0	2.8
195+660	2.6	2.8
195+760	4.6	2.9
195+860	2.7	4.1
195+960	2.2	2.7
196+060	2.2	2.5
196+160	2.2	2.1
196+260	2.1	2.1
196+360	2.3	2.5
196+460	2.2	2.0
196+560	2.7	2.6
196+660	2.5	2.0
196+760	2.4	1.8
196+860	2.7	2.7
196+960	3.0	1.9
197+060	3.0	2.4
197+160	4.7	2.4
197+260	3.2	5.5
197+360	3.0	2.2
197+460	2.6	2.5
197+560	2.7	2.4
197+660	2.3	2.8
197+760	2.1	2.4
197+860	2.4	2.5
197+960	1.9	2.8

KP	RHS Outer Lane	RHS Inner Lane
198+060	2.2	2.4
198+160	2.2	2.0
198+260	2.6	3.1
198+360	2.1	2.0
198+460	2.1	2.4
198+560	2.2	2.2
198+660	2.2	2.8
198+760	1.9	2.5
198+860	2.0	2.6
198+960	2.2	2.6
199+060	1.8	2.0
199+160	2.1	2.1
199+260	1.9	2.7
199+360	2.4	3.1
199+460	2.2	2.3
199+560	2.0	2.9
199+660	1.5	2.2
199+760	2.1	2.3
199+860	2.2	2.2
199+960	2.0	2.6
200+060	2.1	2.3
200+160	2.0	2.2
200+260	2.1	2.2
200+360	2.4	2.9
200+460	3.7	2.2
200+560	1.6	1.6
200+660	2.6	2.8
200+760	2.2	2.5
200+860	2.4	2.3
200+960	2.0	2.7
201+060	2.4	2.0
201+160	2.2	1.9
201+260	2.8	1.8
201+360	1.7	1.7
201+460	2.1	2.2
201+560	2.5	1.7
201+660	1.8	1.7
201+760	2.0	2.2
201+860	2.2	2.2
201+960	2.3	2.3
202+060	2.0	2.3
202+160	1.7	2.1
202+260	2.0	2.7
202+360	2.1	2.1
202+460	2.3	2.4
202+560	2.1	1.8

KP	RHS Outer Lane	RHS Inner Lane
202+660	2.0	2.2
202+760	3.4	2.8
202+860	2.7	3.4
202+960	2.6	2.7
203+060	4.1	3.0
203+160	2.4	3.8
203+260	3.3	2.8
203+360	2.5	2.7
203+460	2.8	3.0
203+560	2.8	3.6
203+660	3.5	3.2
203+760	3.2	3.4
203+860	2.2	3.5
203+960	2.2	2.5
204+060	2.4	2.8
204+160	2.2	2.8
204+260	1.8	2.7
204+360	1.9	2.2
204+460	2.0	2.0
204+560	2.1	2.1
204+660	1.8	2.0
204+760	1.8	1.9
204+860	1.8	2.0
204+960	2.2	2.5
205+060	2.1	2.3
205+160	2.0	2.4
205+260	1.9	2.8
205+360	2.3	2.0
205+460	2.2	2.4
205+560	2.5	2.8
205+660	2.1	2.6
205+760	1.9	2.3
205+860	2.1	2.3
205+960	1.8	2.7
206+060	1.8	2.0
206+160	2.5	1.7
206+260	2.4	1.7
206+360	2.3	2.2
206+460	2.2	2.3
206+560	2.1	2.0
206+660	2.0	2.1
206+760	2.3	2.0
206+860	2.4	1.9
206+960	2.5	1.7
207+060	3.9	3.6
207+160	2.1	3.2



KP	RHS Outer Lane	RHS Inner Lane
207+260	2.4	1.9
207+360	2.2	3.0
207+460	2.0	3.0
207+560	2.1	2.5
207+660	2.0	2.5
207+760	1.7	2.1
207+860	2.0	2.1
207+960	2.0	2.2
208+060	2.6	2.0
208+160	4.5	3.5
208+260	2.4	3.4
208+360	2.1	2.2
208+460	2.0	1.9
208+560	2.4	2.2
208+660	2.0	2.2
208+760	2.5	2.3
208+860	1.9	2.3
208+960	1.8	1.8
209+060	2.9	2.2
209+160	2.6	5.6
209+260	2.5	2.3
209+360	2.6	2.6
209+460	2.5	2.8
209+560	1.9	2.9
209+660	2.5	2.0
209+760	5.1	3.3
209+860	5.9	5.8
209+960	3.5	4.4
210+060	2.0	1.8
210+160	1.9	2.1
210+260	1.7	1.7
210+360	2.6	1.5
210+460	3.3	1.6
210+560	2.5	2.4
210+660	3.1	4.3
210+710		1.8

Table 2. RHS IRI Results

## RUT DEPTH - LHS

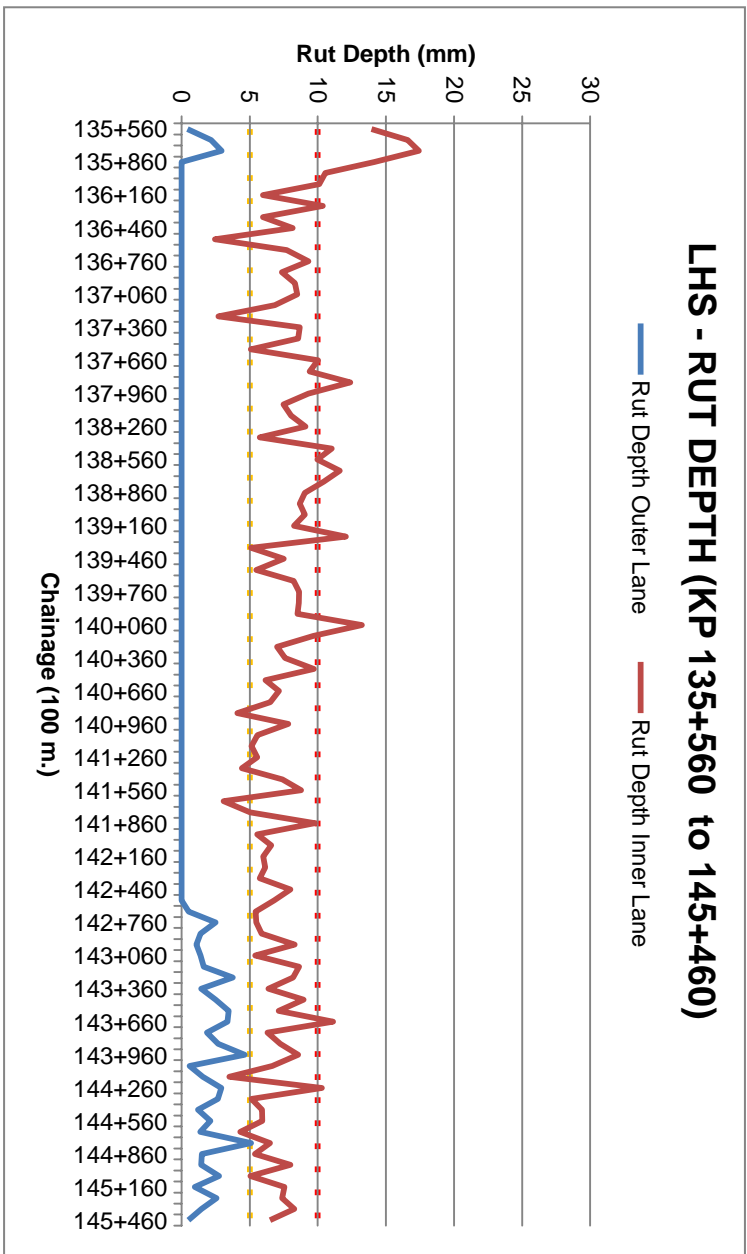


Figure 19. LHS - RUT DEPTH (KP 135+560 to 145+460)

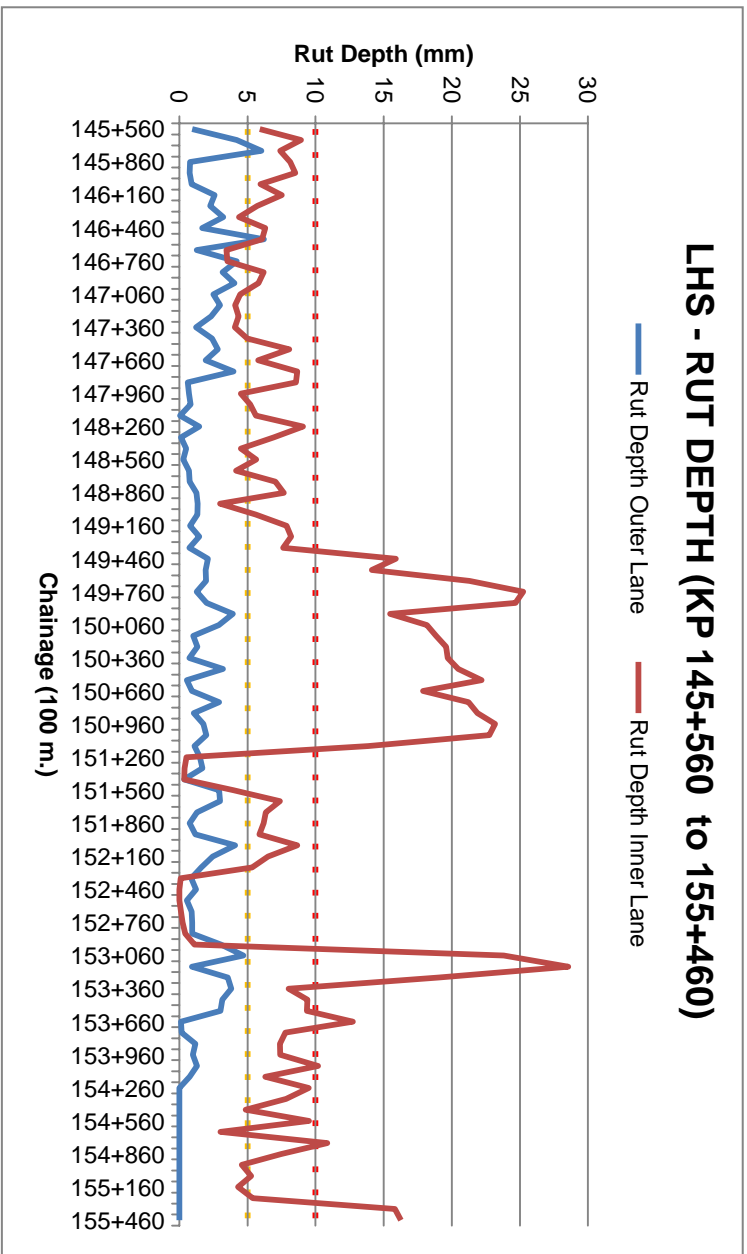


Figure 20. LHS - RUT DEPTH (KP 145+560 to 155+460)

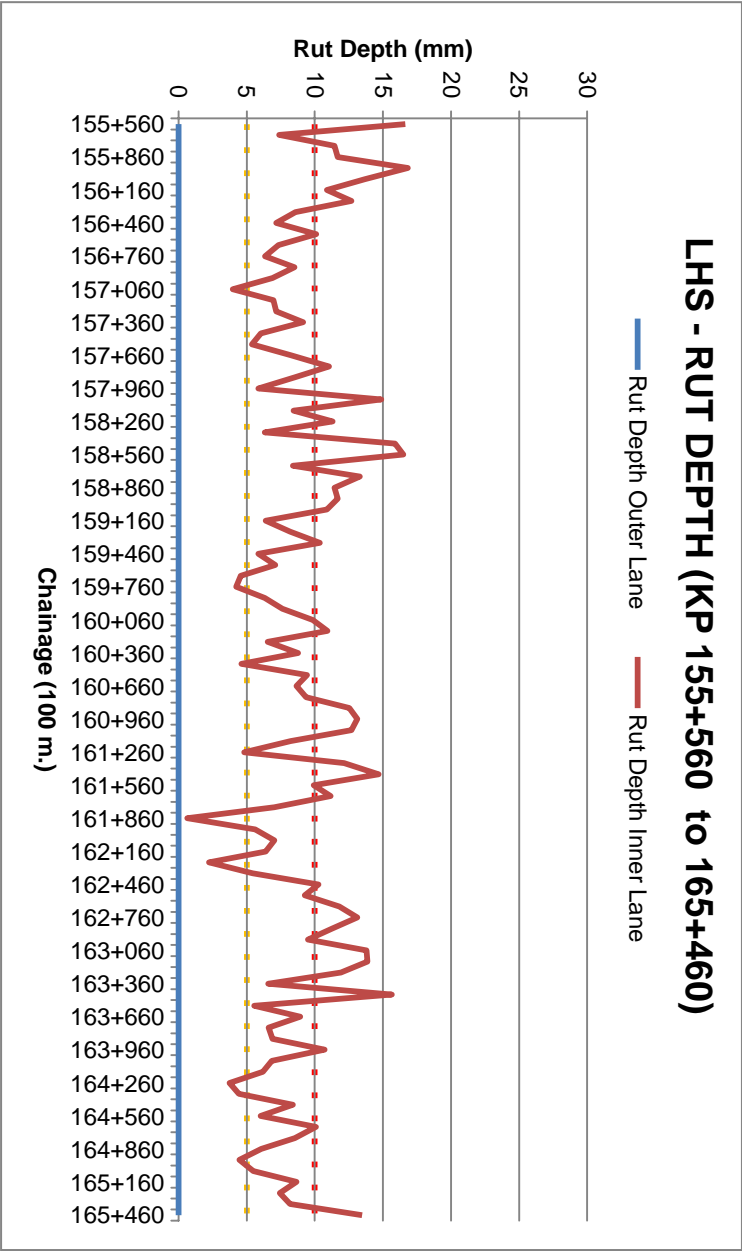


Figure 21. LHS - RUT DEPTH (KP 155+560 to 165+460)

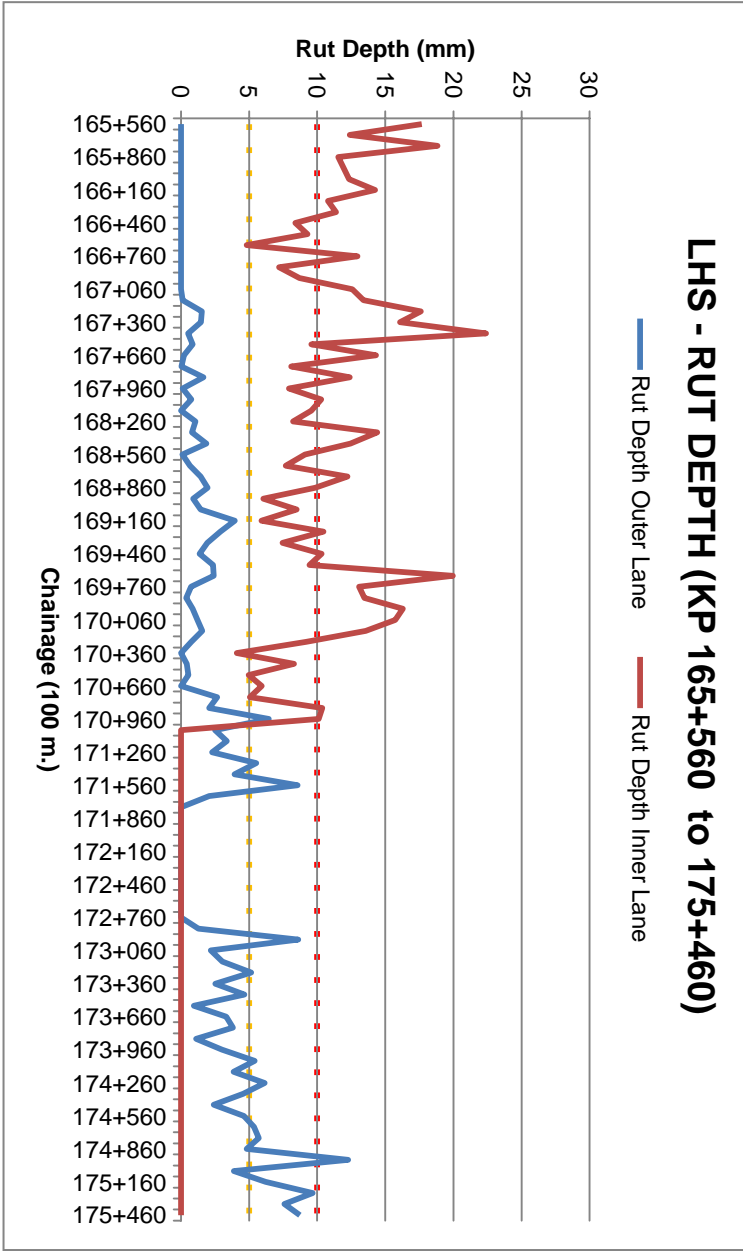


Figure 22. LHS - RUT DEPTH (KP 165+560 to 175+460)

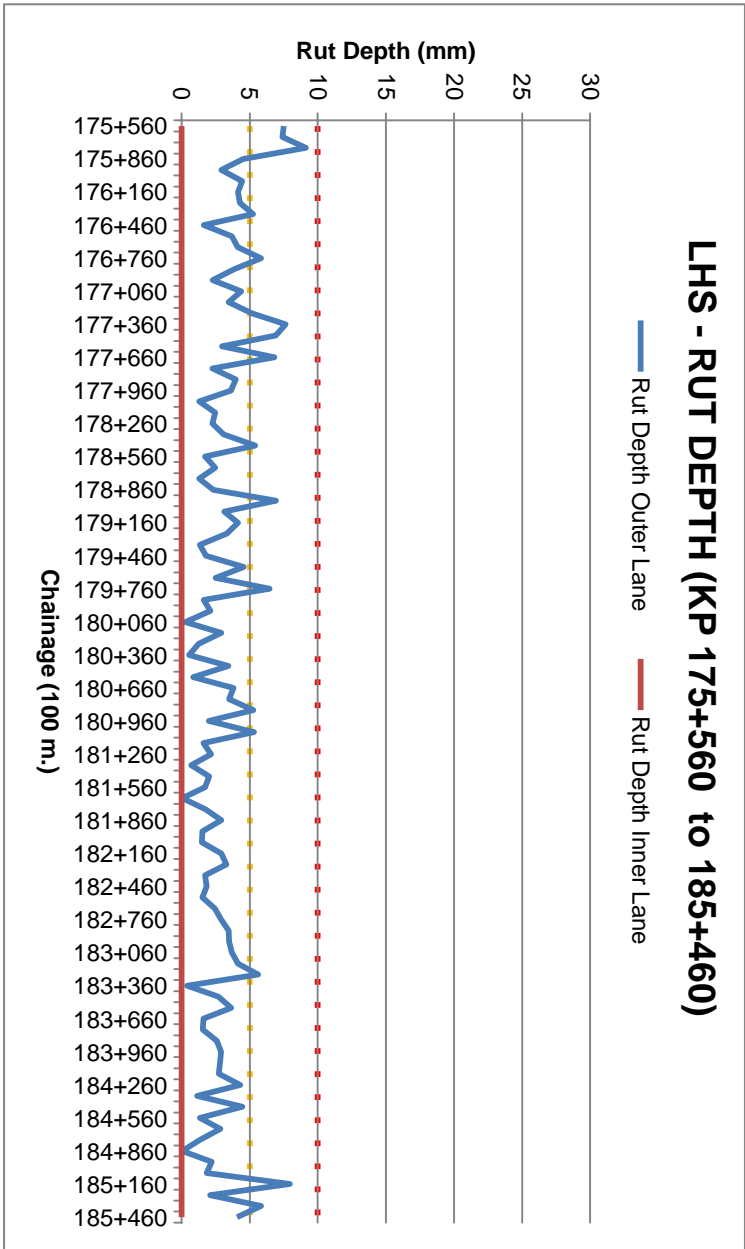


Figure 23. LHS - RUT DEPTH (KP 175+560 to 185+460)

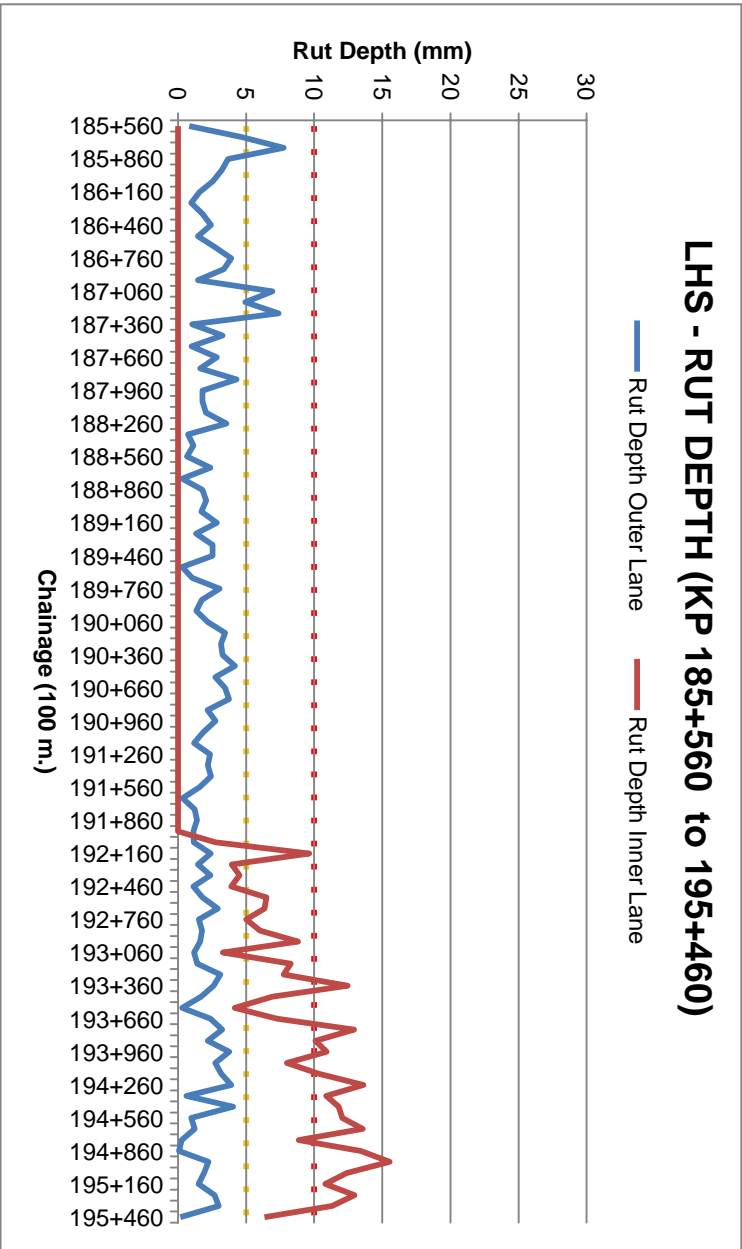


Figure 24. LHS - RUT DEPTH (KP 185+560 to 195+460)

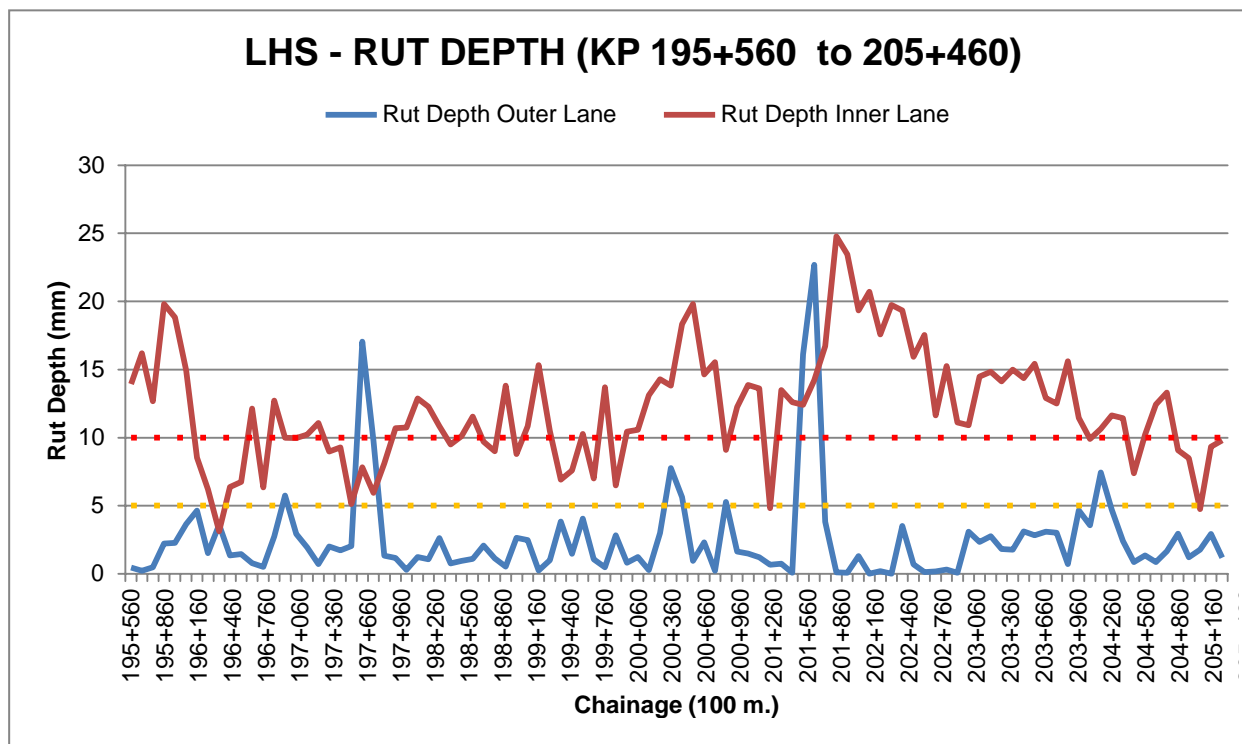


Figure 25. LHS - RUT DEPTH (KP 195+560 to 205+460)

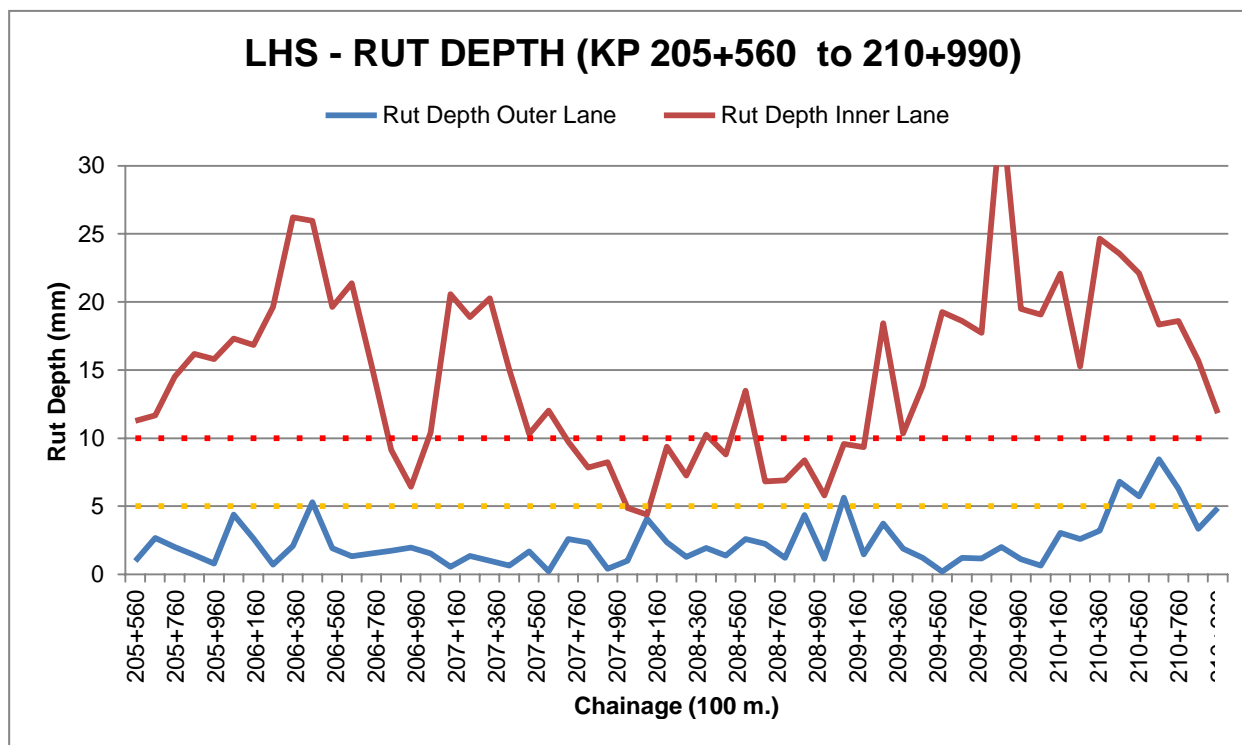


Figure 26. LHS - RUT DEPTH (KP 205+560 to 210+990)

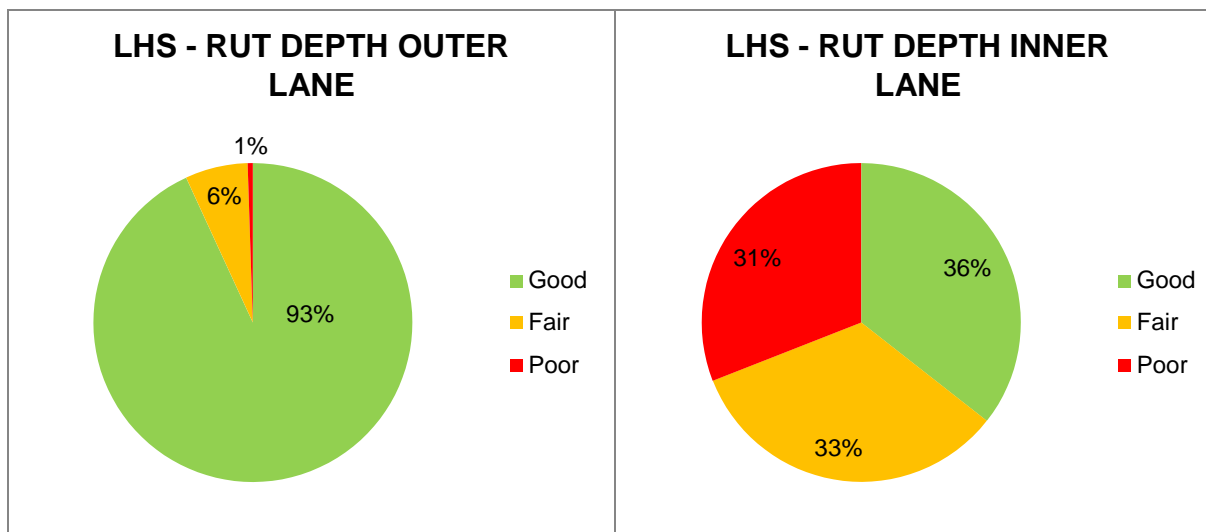


Figure 27. Rut Depth LHS Outer and Inner Lanes Results

KP	LHS Outer Lane	LHS Inner Lane
135+560	0	14
135+660	2	17
135+760	3	17
135+860	0	14
135+960	0	11
136+060	0	10
136+160	0	6
136+260	0	10
136+360	0	6
136+460	0	8
136+560	0	2
136+660	0	8
136+760	0	9
136+860	0	7
136+960	0	8
137+060	0	8
137+160	0	7
137+260	0	3
137+360	0	9
137+460	0	9
137+560	0	5
137+660	0	10
137+760	0	9
137+860	0	12
137+960	0	9
138+060	0	7
138+160	0	8

KP	LHS Outer Lane	LHS Inner Lane
138+260	0	9
138+360	0	6
138+460	0	11
138+560	0	10
138+660	0	12
138+760	0	10
138+860	0	9
138+960	0	9
139+060	0	9
139+160	0	8
139+260	0	12
139+360	0	5
139+460	0	8
139+560	0	5
139+660	0	8
139+760	0	9
139+860	0	9
139+960	0	9
140+060	0	13
140+160	0	10
140+260	0	7
140+360	0	8
140+460	0	10
140+560	0	6
140+660	0	7
140+760	0	7
140+860	0	4
140+960	0	8
141+060	0	6
141+160	0	5
141+260	0	6
141+360	0	4
141+460	0	7
141+560	0	9
141+660	0	3
141+760	0	5
141+860	0	10
141+960	0	6
142+060	0	7
142+160	0	6
142+260	0	6
142+360	0	6
142+460	0	8
142+560	0	7
142+660	1	5
142+760	2	5

KP	LHS Outer Lane	LHS Inner Lane
142+860	1	6
142+960	1	8
143+060	1	5
143+160	2	9
143+260	4	8
143+360	1	6
143+460	3	9
143+560	3	7
143+660	3	11
143+760	2	6
143+860	3	7
143+960	5	9
144+060	1	7
144+160	2	4
144+260	3	10
144+360	3	5
144+460	1	6
144+560	2	6
144+660	1	4
144+760	5	6
144+860	1	5
144+960	1	8
145+060	3	5
145+160	1	8
145+260	3	7
145+360	1	8
145+460	0	6
145+560	1	6
145+660	4	9
145+760	6	7
145+860	1	8
145+960	1	9
146+060	1	6
146+160	3	8
146+260	2	6
146+360	3	4
146+460	2	6
146+560	6	6
146+660	1	3
146+760	4	4
146+860	3	6
146+960	4	6
147+060	2	4
147+160	3	4
147+260	2	4
147+360	1	4



KP	LHS Outer Lane	LHS Inner Lane
147+460	2	5
147+560	3	8
147+660	2	6
147+760	4	9
147+860	1	9
147+960	1	5
148+060	1	5
148+160	0	6
148+260	1	9
148+360	0	7
148+460	1	5
148+560	0	6
148+660	1	4
148+760	1	7
148+860	1	8
148+960	1	3
149+060	1	6
149+160	1	8
149+260	1	8
149+360	1	8
149+460	2	16
149+560	2	14
149+660	2	21
149+760	1	25
149+860	2	25
149+960	4	15
150+060	3	18
150+160	1	19
150+260	1	20
150+360	1	20
150+460	3	20
150+560	1	22
150+660	1	18
150+760	3	21
150+860	1	22
150+960	2	23
151+060	2	23
151+160	1	14
151+260	2	1
151+360	2	0
151+460	0	0
151+560	3	4
151+660	3	7
151+760	1	6
151+860	1	6
151+960	1	6

KP	LHS Outer Lane	LHS Inner Lane
152+060	4	9
152+160	2	7
152+260	2	5
152+360	1	0
152+460	1	0
152+560	1	0
152+660	1	0
152+760	1	0
152+860	1	0
152+960	3	1
153+060	5	24
153+160	1	29
153+260	4	19
153+360	4	8
153+460	3	9
153+560	3	9
153+660	0	13
153+760	0	8
153+860	1	7
153+960	1	7
154+060	1	10
154+160	1	6
154+260	0	9
154+360	0	8
154+460	0	5
154+560	0	10
154+660	0	3
154+760	0	11
154+860	0	7
154+960	0	5
155+060	0	5
155+160	0	4
155+260	0	5
155+360	0	16
155+460	0	16
155+560	0	17
155+660	0	7
155+760	0	11
155+860	0	12
155+960	0	17
156+060	0	14
156+160	0	11
156+260	0	13
156+360	0	9
156+460	0	7
156+560	0	10

KP	LHS Outer Lane	LHS Inner Lane
156+660	0	7
156+760	0	6
156+860	0	9
156+960	0	7
157+060	0	4
157+160	0	7
157+260	0	7
157+360	0	9
157+460	0	6
157+560	0	5
157+660	0	8
157+760	0	11
157+860	0	9
157+960	0	6
158+060	0	15
158+160	0	8
158+260	0	11
158+360	0	6
158+460	0	16
158+560	0	17
158+660	0	8
158+760	0	13
158+860	0	11
158+960	0	12
159+060	0	11
159+160	0	6
159+260	0	8
159+360	0	10
159+460	0	6
159+560	0	7
159+660	0	5
159+760	0	4
159+860	0	6
159+960	0	8
160+060	0	10
160+160	0	11
160+260	0	7
160+360	0	9
160+460	0	5
160+560	0	9
160+660	0	9
160+760	0	9
160+860	0	13
160+960	0	13
161+060	0	13
161+160	0	8

KP	LHS Outer Lane	LHS Inner Lane
161+260	0	5
161+360	0	12
161+460	0	15
161+560	0	10
161+660	0	11
161+760	0	7
161+860	0	1
161+960	0	6
162+060	0	7
162+160	0	6
162+260	0	2
162+360	0	5
162+460	0	10
162+560	0	9
162+660	0	12
162+760	0	13
162+860	0	11
162+960	0	10
163+060	0	14
163+160	0	14
163+260	0	12
163+360	0	7
163+460	0	16
163+560	0	6
163+660	0	9
163+760	0	7
163+860	0	7
163+960	0	11
164+060	0	7
164+160	0	6
164+260	0	4
164+360	0	4
164+460	0	8
164+560	0	6
164+660	0	10
164+760	0	9
164+860	0	6
164+960	0	4
165+060	0	5
165+160	0	9
165+260	0	7
165+360	0	8
165+460	0	13
165+560	0	18
165+660	0	12
165+760	0	19

KP	LHS Outer Lane	LHS Inner Lane
165+860	0	12
165+960	0	12
166+060	0	12
166+160	0	14
166+260	0	11
166+360	0	11
166+460	0	8
166+560	0	9
166+660	0	5
166+760	0	13
166+860	0	7
166+960	0	9
167+060	0	13
167+160	0	13
167+260	2	18
167+360	1	16
167+460	1	22
167+560	1	10
167+660	0	14
167+760	0	8
167+860	2	12
167+960	0	8
168+060	1	10
168+160	0	10
168+260	1	8
168+360	1	14
168+460	2	12
168+560	0	9
168+660	1	8
168+760	1	12
168+860	2	10
168+960	1	6
169+060	1	8
169+160	4	6
169+260	3	10
169+360	2	7
169+460	1	10
169+560	2	9
169+660	2	20
169+760	1	13
169+860	0	13
169+960	1	16
170+060	1	16
170+160	2	14
170+260	1	9
170+360	0	4

KP	LHS Outer Lane	LHS Inner Lane
170+460	0	8
170+560	1	5
170+660	0	6
170+760	3	5
170+860	2	10
170+960	6	10
171+060	2	0
171+160	3	0
171+260	2	0
171+360	6	0
171+460	4	0
171+560	9	0
171+660	2	0
171+760	0	0
171+860	0	0
171+960	0	0
172+060	0	0
172+160	0	0
172+260	0	0
172+360	0	0
172+460	0	0
172+560	0	0
172+660	0	0
172+760	0	0
172+860	1	0
172+960	9	0
173+060	2	0
173+160	3	0
173+260	5	0
173+360	3	0
173+460	5	0
173+560	1	0
173+660	3	0
173+760	4	0
173+860	1	0
173+960	3	0
174+060	5	0
174+160	4	0
174+260	6	0
174+360	5	0
174+460	2	0
174+560	5	0
174+660	5	0
174+760	6	0
174+860	5	0
174+960	12	0

KP	LHS Outer Lane	LHS Inner Lane
175+060	4	0
175+160	6	0
175+260	10	0
175+360	8	0
175+460	9	0
175+560	7	0
175+660	7	0
175+760	9	0
175+860	5	0
175+960	3	0
176+060	4	0
176+160	4	0
176+260	4	0
176+360	5	0
176+460	2	0
176+560	4	0
176+660	4	0
176+760	6	0
176+860	4	0
176+960	2	0
177+060	4	0
177+160	3	0
177+260	5	0
177+360	8	0
177+460	7	0
177+560	3	0
177+660	7	0
177+760	2	0
177+860	4	0
177+960	4	0
178+060	1	0
178+160	2	0
178+260	2	0
178+360	3	0
178+460	5	0
178+560	2	0
178+660	2	0
178+760	1	0
178+860	2	0
178+960	7	0
179+060	3	0
179+160	4	0
179+260	3	0
179+360	1	0
179+460	2	0
179+560	5	0

KP	LHS Outer Lane	LHS Inner Lane
179+660	2	0
179+760	6	0
179+860	2	0
179+960	2	0
180+060	0	0
180+160	3	0
180+260	1	0
180+360	1	0
180+460	3	0
180+560	1	0
180+660	4	0
180+760	3	0
180+860	5	0
180+960	2	0
181+060	5	0
181+160	2	0
181+260	2	0
181+360	1	0
181+460	2	0
181+560	2	0
181+660	0	0
181+760	2	0
181+860	3	0
181+960	2	0
182+060	1	0
182+160	3	0
182+260	3	0
182+360	2	0
182+460	2	0
182+560	2	0
182+660	2	0
182+760	3	0
182+860	3	0
182+960	3	0
183+060	4	0
183+160	4	0
183+260	6	0
183+360	0	0
183+460	3	0
183+560	4	0
183+660	2	0
183+760	2	0
183+860	3	0
183+960	3	0
184+060	3	0
184+160	3	0



KP	LHS Outer Lane	LHS Inner Lane
184+260	4	0
184+360	1	0
184+460	4	0
184+560	1	0
184+660	3	0
184+760	1	0
184+860	0	0
184+960	2	0
185+060	2	0
185+160	8	0
185+260	2	0
185+360	6	0
185+460	4	0
185+560	1	0
185+660	5	0
185+760	8	0
185+860	4	0
185+960	3	0
186+060	3	0
186+160	2	0
186+260	1	0
186+360	2	0
186+460	2	0
186+560	1	0
186+660	3	0
186+760	4	0
186+860	3	0
186+960	1	0
187+060	7	0
187+160	5	0
187+260	7	0
187+360	1	0
187+460	3	0
187+560	1	0
187+660	3	0
187+760	2	0
187+860	4	0
187+960	2	0
188+060	2	0
188+160	2	0
188+260	4	0
188+360	1	0
188+460	1	0
188+560	1	0
188+660	2	0
188+760	0	0

KP	LHS Outer Lane	LHS Inner Lane
188+860	2	0
188+960	2	0
189+060	2	0
189+160	3	0
189+260	1	0
189+360	3	0
189+460	3	0
189+560	0	0
189+660	1	0
189+760	3	0
189+860	2	0
189+960	1	0
190+060	2	0
190+160	3	0
190+260	3	0
190+360	3	0
190+460	4	0
190+560	3	0
190+660	3	0
190+760	4	0
190+860	2	0
190+960	3	0
191+060	2	0
191+160	1	0
191+260	2	0
191+360	2	0
191+460	2	0
191+560	2	0
191+660	0	0
191+760	1	0
191+860	1	0
191+960	1	0
192+060	1	3
192+160	2	10
192+260	1	4
192+360	2	5
192+460	1	4
192+560	2	6
192+660	3	6
192+760	2	5
192+860	2	6
192+960	2	9
193+060	1	3
193+160	1	8
193+260	3	8
193+360	3	12

KP	LHS Outer Lane	LHS Inner Lane
193+460	2	7
193+560	0	4
193+660	2	7
193+760	3	13
193+860	2	10
193+960	4	11
194+060	3	8
194+160	3	10
194+260	4	14
194+360	1	11
194+460	4	12
194+560	1	12
194+660	1	14
194+760	0	9
194+860	0	13
194+960	2	16
195+060	2	12
195+160	1	11
195+260	3	13
195+360	3	11
195+460	0	6
195+560	0	14
195+660	0	16
195+760	0	13
195+860	2	20
195+960	2	19
196+060	4	15
196+160	5	9
196+260	2	6
196+360	4	3
196+460	1	6
196+560	1	7
196+660	1	12
196+760	0	6
196+860	3	13
196+960	6	10
197+060	3	10
197+160	2	10
197+260	1	11
197+360	2	9
197+460	2	9
197+560	2	5
197+660	17	8
197+760	10	6
197+860	1	8
197+960	1	11

KP	LHS Outer Lane	LHS Inner Lane
198+060	0	11
198+160	1	13
198+260	1	12
198+360	3	11
198+460	1	10
198+560	1	10
198+660	1	12
198+760	2	10
198+860	1	9
198+960	1	14
199+060	3	9
199+160	2	11
199+260	0	15
199+360	1	10
199+460	4	7
199+560	1	8
199+660	4	10
199+760	1	7
199+860	0	14
199+960	3	6
200+060	1	10
200+160	1	11
200+260	0	13
200+360	3	14
200+460	8	14
200+560	6	18
200+660	1	20
200+760	2	15
200+860	0	16
200+960	5	9
201+060	2	12
201+160	1	14
201+260	1	14
201+360	1	5
201+460	1	13
201+560	0	13
201+660	16	12
201+760	23	14
201+860	4	17
201+960	0	25
202+060	0	23
202+160	1	19
202+260	0	21
202+360	0	18
202+460	0	20
202+560	4	19

KP	LHS Outer Lane	LHS Inner Lane
202+660	1	16
202+760	0	18
202+860	0	12
202+960	0	15
203+060	0	11
203+160	3	11
203+260	2	14
203+360	3	15
203+460	2	14
203+560	2	15
203+660	3	14
203+760	3	15
203+860	3	13
203+960	3	13
204+060	1	16
204+160	5	11
204+260	4	10
204+360	7	11
204+460	5	12
204+560	2	11
204+660	1	7
204+760	1	10
204+860	1	12
204+960	2	13
205+060	3	9
205+160	1	8
205+260	2	5
205+360	3	9
205+460	1	10
205+560	1	11
205+660	3	12
205+760	2	14
205+860	1	16
205+960	1	16
206+060	4	17
206+160	3	17
206+260	1	20
206+360	2	26
206+460	5	26
206+560	2	20
206+660	1	21
206+760	2	15
206+860	2	9
206+960	2	6
207+060	2	10
207+160	1	21

KP	LHS Outer Lane	LHS Inner Lane
207+260	1	19
207+360	1	20
207+460	1	15
207+560	2	10
207+660	0	12
207+760	3	10
207+860	2	8
207+960	0	8
208+060	1	5
208+160	4	4
208+260	2	9
208+360	1	7
208+460	2	10
208+560	1	9
208+660	3	13
208+760	2	7
208+860	1	7
208+960	4	8
209+060	1	6
209+160	6	10
209+260	1	9
209+360	4	18
209+460	2	10
209+560	1	14
209+660	0	19
209+760	1	19
209+860	1	18
209+960	2	34
210+060	1	19
210+160	1	19
210+260	3	22
210+360	3	15
210+460	3	25
210+560	7	24
210+660	6	22
210+760	8	18
210+860	6	19
210+960	3	16
210+990	5	12

Table 3. LHS Rut Depth Results

## RUT DEPTH - RHS

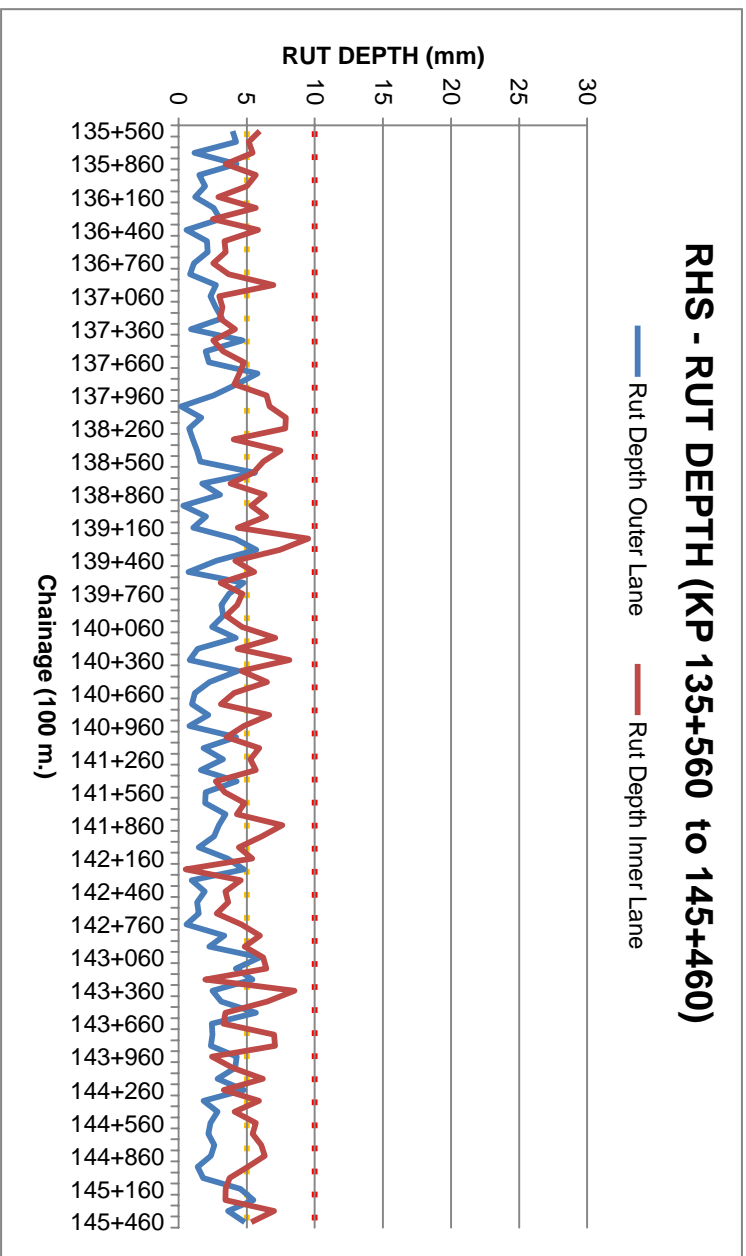


Figure 28. RHS - RUT DEPTH (KP 135+560 to 145+460)

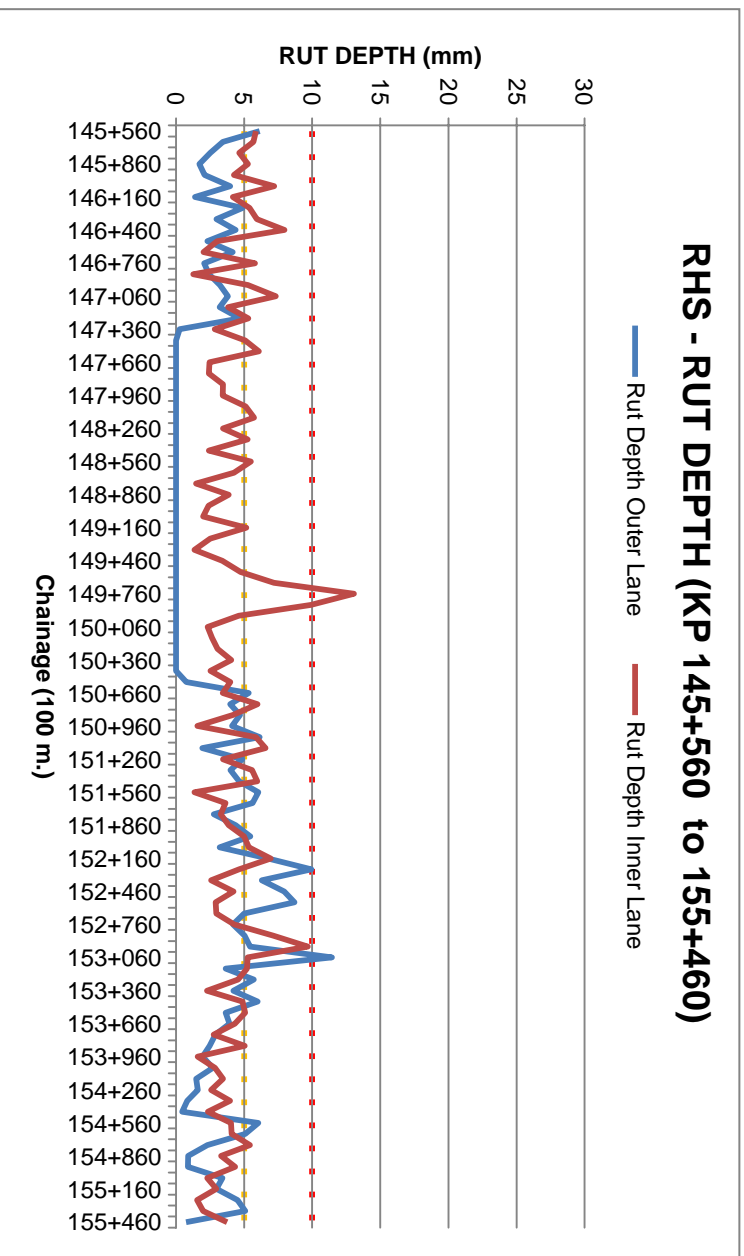


Figure 29. RHS - RUT DEPTH (KP 145+560 to 155+460)

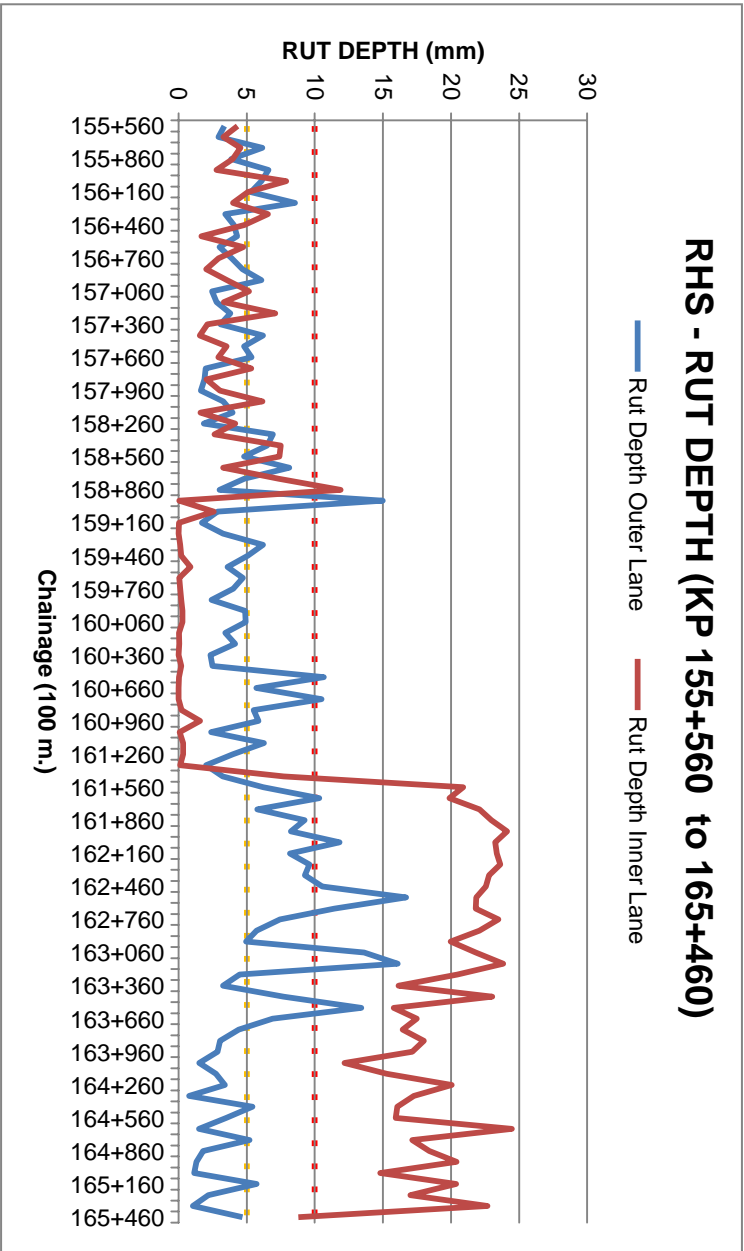


Figure 30. RHS - RUT DEPTH (KP 155+560 to 165+460)

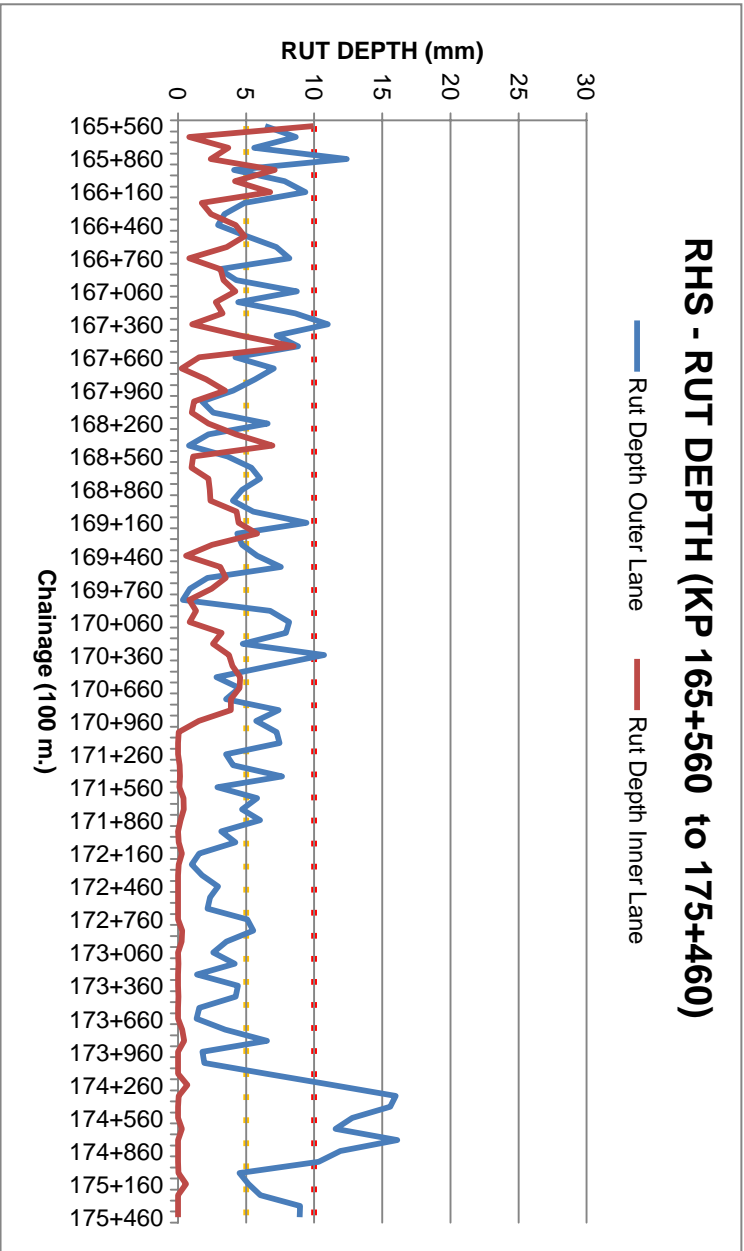


Figure 31. RHS - RUT DEPTH (KP 165+560 to 175+460)



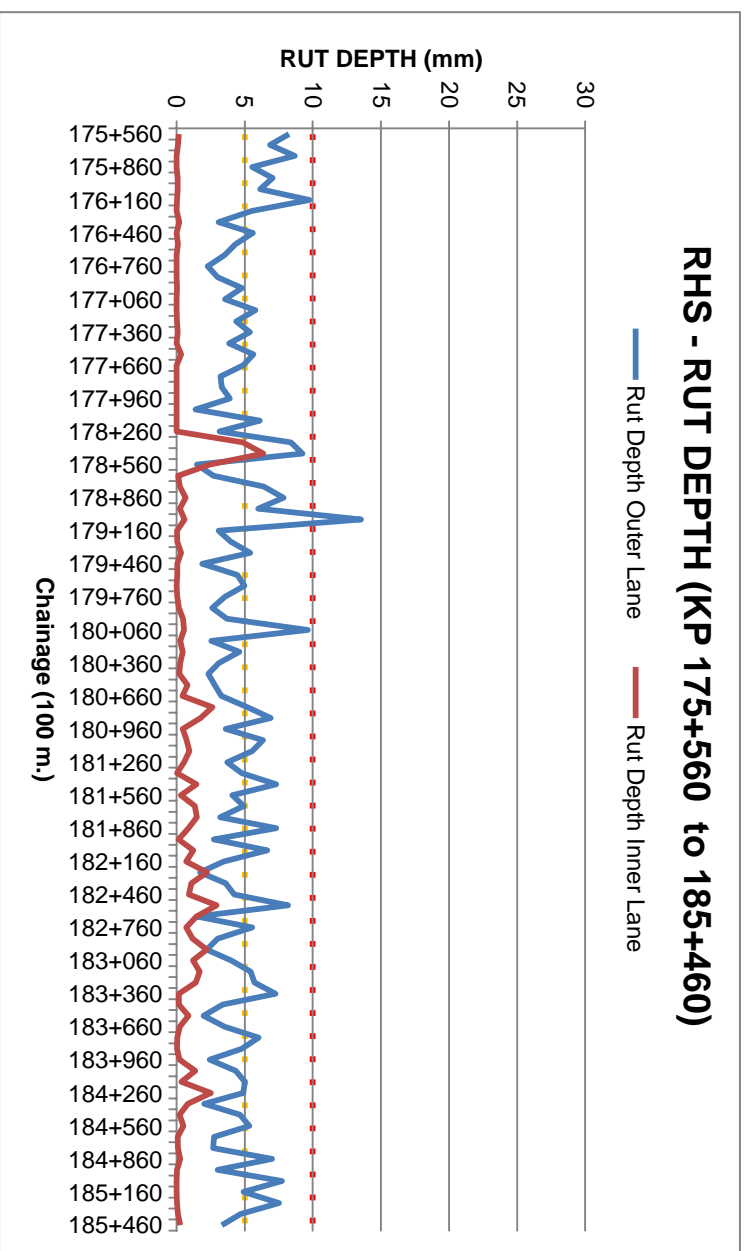


Figure 32. RHS - RUT DEPTH (KP 175+560 to 185+460)

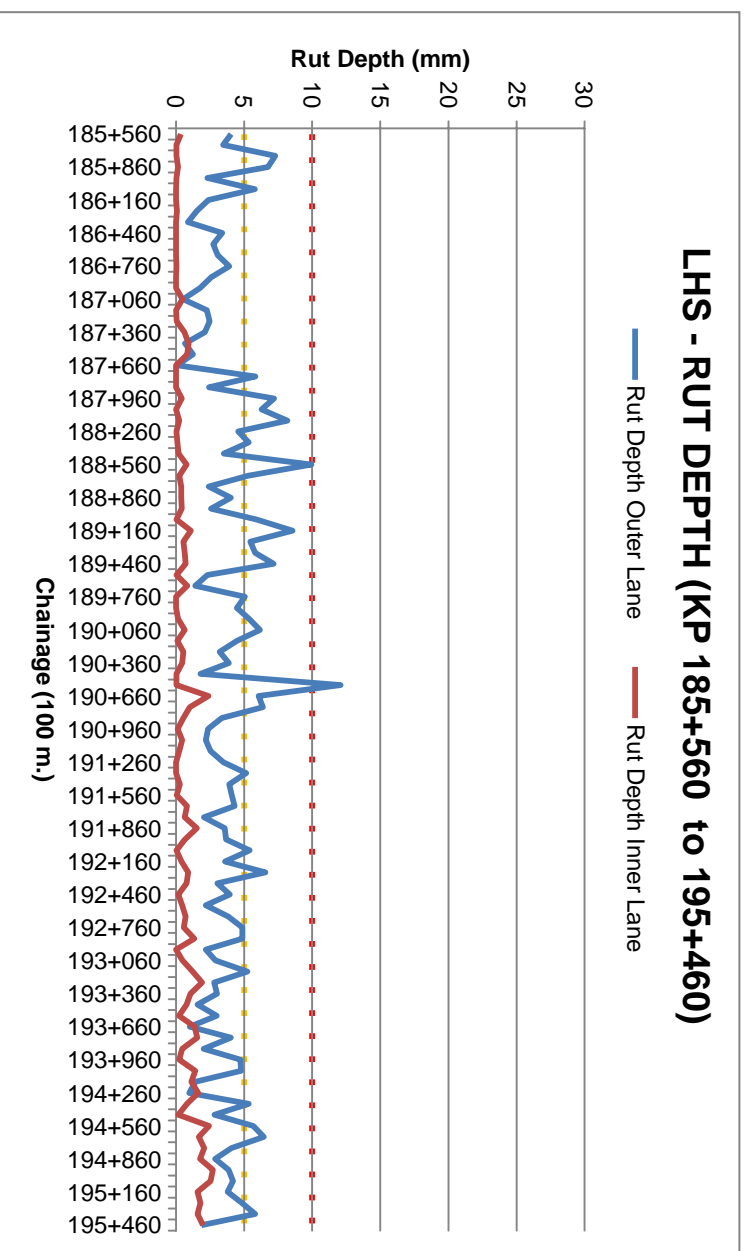


Figure 33. RHS - RUT DEPTH (KP 185+560 to 195+460)

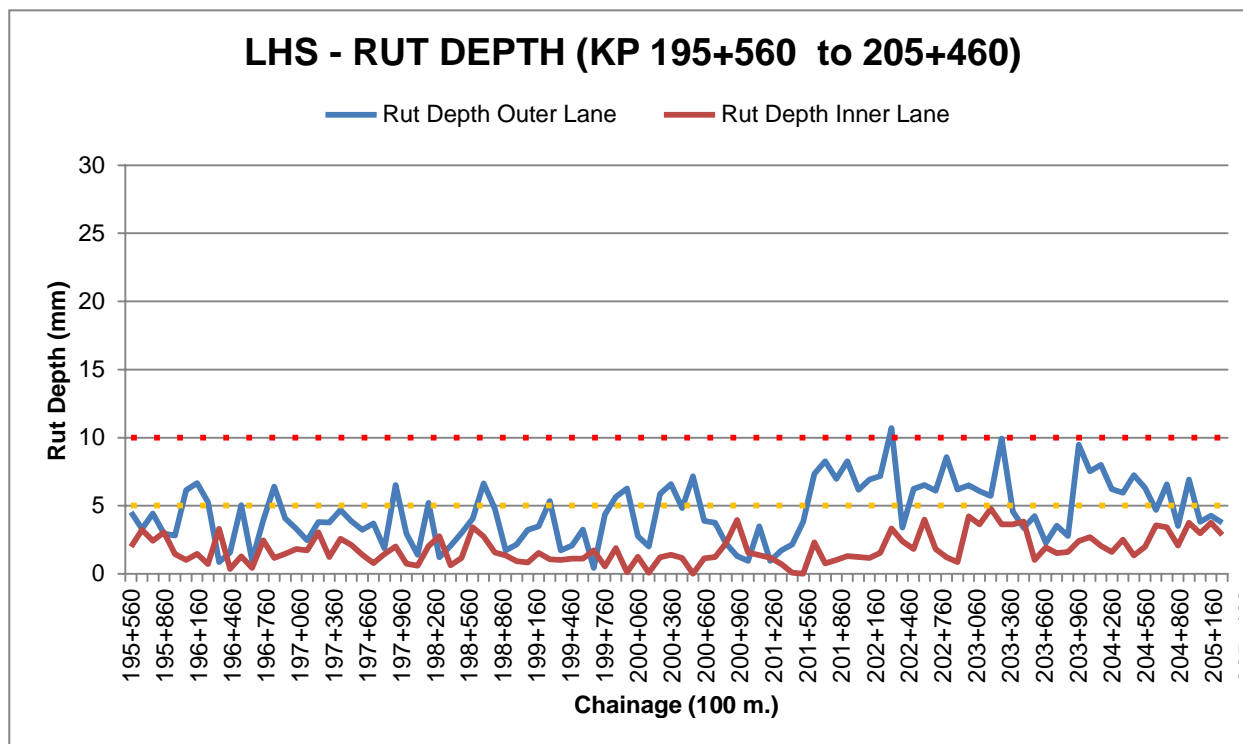


Figure 34. RHS - RUT DEPTH (KP 195+560 to 205+460)

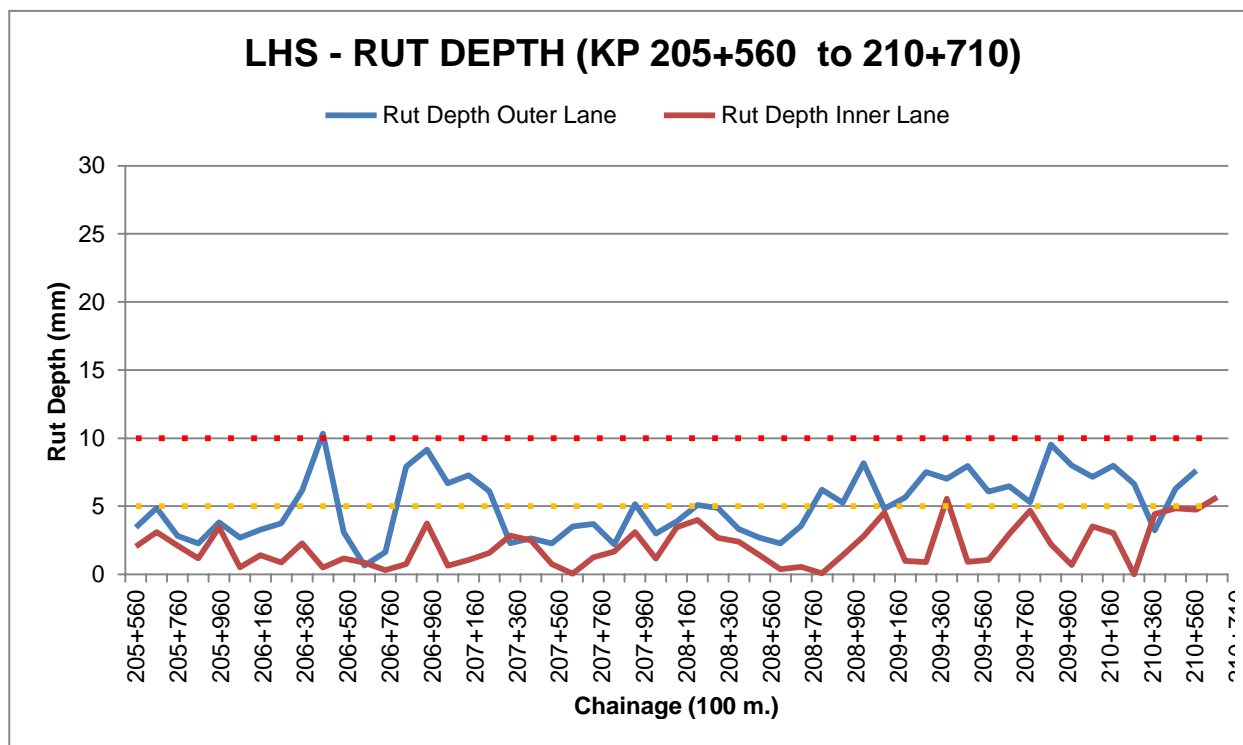


Figure 35. RHS - RUT DEPTH (KP 205+560 to 210+710)

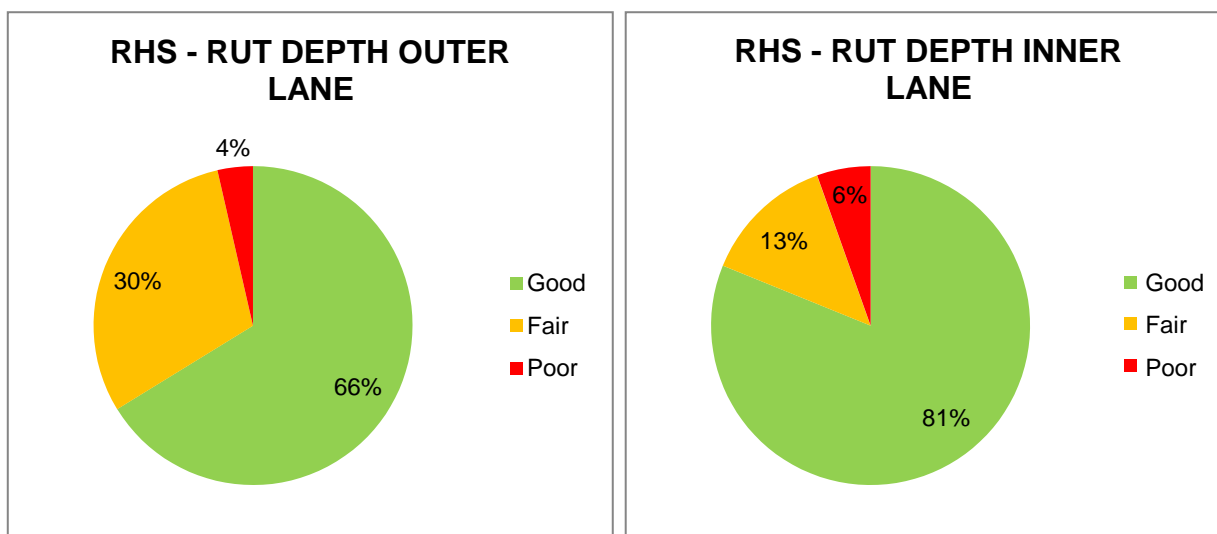


Figure 36. Rut Depth RHS Outer and Inner Lanes Results

KP	RHS Outer Lane	RHS Inner Lane
135+560	4	6
135+660	4	5
135+760	1	5
135+860	4	3
135+960	2	6
136+060	2	5
136+160	1	3
136+260	3	6
136+360	3	3
136+460	1	6
136+560	2	3
136+660	2	3
136+760	1	3
136+860	1	4
136+960	3	7
137+060	2	3
137+160	3	3
137+260	3	3
137+360	1	4
137+460	5	3
137+560	2	3
137+660	2	5
137+760	6	4
137+860	4	4
137+960	3	6
138+060	0	7

KP	RHS Outer Lane	RHS Inner Lane
138+160	2	8
138+260	1	8
138+360	1	4
138+460	1	7
138+560	2	6
138+660	6	5
138+760	2	4
138+860	3	6
138+960	0	5
139+060	2	6
139+160	1	4
139+260	4	10
139+360	6	7
139+460	3	4
139+560	1	6
139+660	5	3
139+760	4	5
139+860	3	4
139+960	3	3
140+060	2	5
140+160	4	7
140+260	1	4
140+360	1	8
140+460	4	5
140+560	2	6
140+660	1	4
140+760	1	3
140+860	2	7
140+960	1	5
141+060	4	4
141+160	2	6
141+260	3	5
141+360	2	6
141+460	4	3
141+560	2	3
141+660	2	5
141+760	3	4
141+860	3	8
141+960	3	6
142+060	1	4
142+160	4	5
142+260	5	1
142+360	1	5
142+460	2	3
142+560	1	4
142+660	1	3

KP	RHS Outer Lane	RHS Inner Lane
142+760	1	5
142+860	3	6
142+960	2	5
143+060	6	6
143+160	4	6
143+260	5	2
143+360	3	9
143+460	3	7
143+560	6	3
143+660	2	3
143+760	2	7
143+860	2	7
143+960	4	2
144+060	4	4
144+160	3	6
144+260	5	3
144+360	2	6
144+460	3	4
144+560	2	6
144+660	2	5
144+760	3	6
144+860	2	6
144+960	1	5
145+060	2	4
145+160	5	3
145+260	5	3
145+360	4	7
145+460	5	5
145+560	6	6
145+660	3	6
145+760	3	5
145+860	2	5
145+960	2	4
146+060	4	7
146+160	1	4
146+260	5	5
146+360	3	6
146+460	4	8
146+560	2	3
146+660	4	2
146+760	2	6
146+860	2	1
146+960	3	5
147+060	4	7
147+160	3	4
147+260	5	5

KP	RHS Outer Lane	RHS Inner Lane
147+360	0	3
147+460	0	5
147+560	0	6
147+660	0	2
147+760	0	2
147+860	0	3
147+960	0	3
148+060	0	5
148+160	0	6
148+260	0	3
148+360	0	5
148+460	0	2
148+560	0	6
148+660	0	4
148+760	0	1
148+860	0	4
148+960	0	2
149+060	0	2
149+160	0	5
149+260	0	3
149+360	0	1
149+460	0	3
149+560	0	5
149+660	0	7
149+760	0	13
149+860	0	10
149+960	0	5
150+060	0	2
150+160	0	3
150+260	0	3
150+360	0	4
150+460	0	3
150+560	1	4
150+660	5	3
150+760	4	6
150+860	5	4
150+960	4	2
151+060	6	6
151+160	2	7
151+260	5	3
151+360	4	6
151+460	5	6
151+560	6	1
151+660	6	4
151+760	3	3
151+860	4	4

KP	RHS Outer Lane	RHS Inner Lane
151+960	5	5
152+060	3	5
152+160	7	7
152+260	10	5
152+360	6	3
152+460	8	4
152+560	9	3
152+660	5	3
152+760	4	4
152+860	5	7
152+960	5	10
153+060	11	5
153+160	4	5
153+260	6	5
153+360	4	2
153+460	6	5
153+560	4	5
153+660	4	4
153+760	3	3
153+860	2	5
153+960	2	2
154+060	3	3
154+160	1	3
154+260	2	3
154+360	1	4
154+460	0	2
154+560	6	4
154+660	5	4
154+760	2	5
154+860	1	3
154+960	1	4
155+060	3	2
155+160	3	3
155+260	5	2
155+360	5	2
155+460	1	4
155+560	3	4
155+660	3	3
155+760	6	5
155+860	4	4
155+960	7	3
156+060	6	8
156+160	5	5
156+260	9	4
156+360	3	7
156+460	4	5

KP	RHS Outer Lane	RHS Inner Lane
156+560	4	2
156+660	3	5
156+760	4	3
156+860	5	2
156+960	6	4
157+060	2	5
157+160	3	3
157+260	4	7
157+360	3	2
157+460	6	2
157+560	5	4
157+660	5	3
157+760	2	5
157+860	2	2
157+960	2	3
158+060	3	6
158+160	4	2
158+260	2	4
158+360	7	3
158+460	7	7
158+560	5	7
158+660	8	3
158+760	5	7
158+860	3	12
158+960	15	0
159+060	3	3
159+160	2	0
159+260	3	0
159+360	6	0
159+460	5	0
159+560	4	1
159+660	5	0
159+760	4	0
159+860	2	0
159+960	5	0
160+060	5	0
160+160	3	0
160+260	4	0
160+360	2	0
160+460	2	0
160+560	11	0
160+660	6	0
160+760	11	0
160+860	6	0
160+960	6	2
161+060	2	0



KP	RHS Outer Lane	RHS Inner Lane
161+160	6	0
161+260	4	0
161+360	2	0
161+460	3	8
161+560	6	21
161+660	10	20
161+760	6	22
161+860	9	23
161+960	8	24
162+060	12	23
162+160	8	23
162+260	10	24
162+360	9	23
162+460	11	23
162+560	17	22
162+660	11	22
162+760	7	23
162+860	6	22
162+960	5	20
163+060	14	22
163+160	16	24
163+260	4	20
163+360	3	16
163+460	8	23
163+560	13	16
163+660	7	17
163+760	4	16
163+860	3	18
163+960	3	17
164+060	2	12
164+160	3	15
164+260	3	20
164+360	1	17
164+460	5	16
164+560	4	16
164+660	2	24
164+760	5	17
164+860	2	18
164+960	1	20
165+060	1	15
165+160	6	20
165+260	2	17
165+360	1	23
165+460	5	9
165+560	6	10
165+660	9	1

KP	RHS Outer Lane	RHS Inner Lane
165+760	6	4
165+860	12	2
165+960	4	7
166+060	8	4
166+160	9	7
166+260	5	2
166+360	3	2
166+460	3	4
166+560	5	5
166+660	7	4
166+760	8	1
166+860	3	3
166+960	4	3
167+060	9	4
167+160	4	3
167+260	9	3
167+360	11	1
167+460	7	5
167+560	9	8
167+660	4	2
167+760	7	0
167+860	6	2
167+960	4	3
168+060	2	1
168+160	3	1
168+260	7	2
168+360	2	4
168+460	1	7
168+560	4	1
168+660	5	1
168+760	6	2
168+860	5	2
168+960	4	2
169+060	6	4
169+160	9	4
169+260	4	6
169+360	5	2
169+460	6	1
169+560	8	3
169+660	2	4
169+760	1	2
169+860	0	1
169+960	7	1
170+060	8	1
170+160	8	3
170+260	5	3

KP	RHS Outer Lane	RHS Inner Lane
170+360	11	4
170+460	7	4
170+560	3	5
170+660	4	5
170+760	4	4
170+860	7	4
170+960	6	2
171+060	7	0
171+160	7	0
171+260	4	0
171+360	4	0
171+460	8	0
171+560	3	0
171+660	6	0
171+760	5	0
171+860	6	0
171+960	3	0
172+060	4	0
172+160	2	0
172+260	1	0
172+360	2	0
172+460	3	0
172+560	2	0
172+660	2	0
172+760	5	0
172+860	6	0
172+960	4	0
173+060	3	0
173+160	4	0
173+260	1	0
173+360	4	0
173+460	4	0
173+560	2	0
173+660	1	0
173+760	3	0
173+860	7	0
173+960	2	0
174+060	2	0
174+160	6	0
174+260	11	1
174+360	16	0
174+460	16	0
174+560	13	0
174+660	12	0
174+760	16	0
174+860	12	0

KP	RHS Outer Lane	RHS Inner Lane
174+960	10	0
175+060	5	0
175+160	5	1
175+260	6	0
175+360	9	0
175+460	9	0
175+560	8	0
175+660	7	0
175+760	9	0
175+860	6	0
175+960	7	0
176+060	6	0
176+160	10	0
176+260	6	0
176+360	3	0
176+460	6	0
176+560	4	0
176+660	4	0
176+760	2	0
176+860	3	0
176+960	5	0
177+060	4	0
177+160	6	0
177+260	4	0
177+360	5	0
177+460	4	0
177+560	6	0
177+660	5	0
177+760	3	0
177+860	3	0
177+960	4	0
178+060	1	0
178+160	6	0
178+260	3	0
178+360	8	5
178+460	9	6
178+560	1	2
178+660	3	0
178+760	6	0
178+860	8	1
178+960	6	0
179+060	14	1
179+160	3	0
179+260	4	0
179+360	5	0
179+460	2	0

KP	RHS Outer Lane	RHS Inner Lane
179+560	4	0
179+660	5	0
179+760	4	0
179+860	3	0
179+960	4	0
180+060	10	1
180+160	3	0
180+260	5	0
180+360	3	0
180+460	2	0
180+560	3	1
180+660	3	0
180+760	5	3
180+860	7	2
180+960	4	0
181+060	6	1
181+160	6	1
181+260	4	1
181+360	5	0
181+460	7	1
181+560	4	0
181+660	5	1
181+760	3	1
181+860	7	1
181+960	3	0
182+060	7	1
182+160	3	1
182+260	2	2
182+360	4	1
182+460	4	1
182+560	8	3
182+660	1	1
182+760	6	1
182+860	3	1
182+960	2	2
183+060	4	1
183+160	5	2
183+260	6	1
183+360	7	0
183+460	3	0
183+560	2	1
183+660	4	0
183+760	6	0
183+860	5	0
183+960	2	0
184+060	4	1

KP	RHS Outer Lane	RHS Inner Lane
184+160	5	0
184+260	5	3
184+360	2	1
184+460	5	0
184+560	5	0
184+660	3	0
184+760	3	0
184+860	7	0
184+960	3	0
185+060	8	0
185+160	5	0
185+260	8	0
185+360	5	0
185+460	3	0
185+560	4	0
185+660	3	0
185+760	7	0
185+860	7	0
185+960	2	0
186+060	6	0
186+160	2	0
186+260	2	0
186+360	1	0
186+460	3	0
186+560	3	0
186+660	3	0
186+760	4	0
186+860	3	0
186+960	2	0
187+060	1	0
187+160	2	0
187+260	2	0
187+360	2	1
187+460	1	1
187+560	1	1
187+660	0	0
187+760	6	0
187+860	2	0
187+960	7	0
188+060	6	0
188+160	8	0
188+260	5	0
188+360	5	0
188+460	4	0
188+560	10	1
188+660	5	0

KP	RHS Outer Lane	RHS Inner Lane
188+760	2	0
188+860	4	0
188+960	3	0
189+060	6	0
189+160	9	1
189+260	5	1
189+360	6	1
189+460	7	1
189+560	2	0
189+660	1	1
189+760	5	0
189+860	4	0
189+960	5	0
190+060	6	1
190+160	4	0
190+260	3	1
190+360	4	0
190+460	2	0
190+560	12	0
190+660	6	2
190+760	6	1
190+860	3	1
190+960	2	0
191+060	2	0
191+160	3	0
191+260	3	0
191+360	5	0
191+460	4	0
191+560	4	0
191+660	4	1
191+760	2	1
191+860	4	2
191+960	4	1
192+060	5	0
192+160	4	0
192+260	7	1
192+360	3	1
192+460	4	0
192+560	2	0
192+660	4	1
192+760	5	1
192+860	5	1
192+960	2	0
193+060	3	0
193+160	5	1
193+260	3	2

KP	RHS Outer Lane	RHS Inner Lane
193+360	3	1
193+460	2	1
193+560	3	0
193+660	1	1
193+760	4	2
193+860	2	0
193+960	5	0
194+060	5	1
194+160	1	1
194+260	1	2
194+360	5	1
194+460	3	0
194+560	6	2
194+660	6	2
194+760	4	2
194+860	3	2
194+960	4	3
195+060	4	3
195+160	4	2
195+260	5	2
195+360	6	2
195+460	2	2
195+560	5	2
195+660	3	3
195+760	4	2
195+860	3	3
195+960	3	1
196+060	6	1
196+160	7	1
196+260	5	1
196+360	1	3
196+460	2	0
196+560	5	1
196+660	1	0
196+760	4	2
196+860	6	1
196+960	4	1
197+060	3	2
197+160	2	2
197+260	4	3
197+360	4	1
197+460	5	3
197+560	4	2
197+660	3	1
197+760	4	1
197+860	2	1



KP	RHS Outer Lane	RHS Inner Lane
197+960	7	2
198+060	3	1
198+160	1	1
198+260	5	2
198+360	1	3
198+460	2	1
198+560	3	1
198+660	4	3
198+760	7	3
198+860	5	2
198+960	2	1
199+060	2	1
199+160	3	1
199+260	3	2
199+360	5	1
199+460	2	1
199+560	2	1
199+660	3	1
199+760	0	2
199+860	4	1
199+960	6	2
200+060	6	0
200+160	3	1
200+260	2	0
200+360	6	1
200+460	7	1
200+560	5	1
200+660	7	0
200+760	4	1
200+860	4	1
200+960	2	2
201+060	1	4
201+160	1	2
201+260	3	1
201+360	1	1
201+460	2	1
201+560	2	0
201+660	4	0
201+760	7	2
201+860	8	1
201+960	7	1
202+060	8	1
202+160	6	1
202+260	7	1
202+360	7	2
202+460	11	3

KP	RHS Outer Lane	RHS Inner Lane
202+560	3	2
202+660	6	2
202+760	7	4
202+860	6	2
202+960	9	1
203+060	6	1
203+160	6	4
203+260	6	4
203+360	6	5
203+460	10	4
203+560	5	4
203+660	3	4
203+760	4	1
203+860	2	2
203+960	4	2
204+060	3	2
204+160	9	2
204+260	8	3
204+360	8	2
204+460	6	2
204+560	6	2
204+660	7	1
204+760	6	2
204+860	5	4
204+960	7	3
205+060	4	2
205+160	7	4
205+260	4	3
205+360	4	4
205+460	4	3
205+560	3	2
205+660	5	3
205+760	3	2
205+860	2	1
205+960	4	3
206+060	3	1
206+160	3	1
206+260	4	1
206+360	6	2
206+460	10	0
206+560	3	1
206+660	1	1
206+760	2	0
206+860	8	1
206+960	9	4
207+060	7	1

KP	RHS Outer Lane	RHS Inner Lane
207+160	7	1
207+260	6	2
207+360	2	3
207+460	3	2
207+560	2	1
207+660	4	0
207+760	4	1
207+860	2	2
207+960	5	3
208+060	3	1
208+160	4	3
208+260	5	4
208+360	5	3
208+460	3	2
208+560	3	1
208+660	2	0
208+760	4	1
208+860	6	0
208+960	5	1
209+060	8	3
209+160	5	5
209+260	6	1
209+360	7	1
209+460	7	6
209+560	8	1
209+660	6	1
209+760	6	3
209+860	5	5
209+960	10	2
210+060	8	1
210+160	7	4
210+260	8	3
210+360	7	0
210+460	3	4
210+560	6	5
210+660	8	5
210+710		6

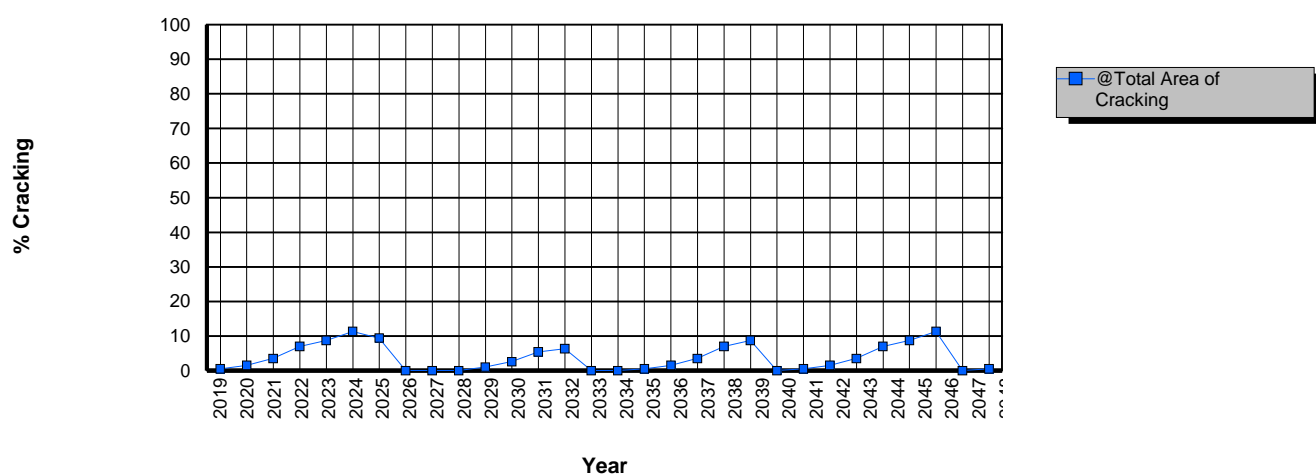
Table 4. RHS Rut Depth Results

## ANNEXURE 6 HDM-4 RESULTS

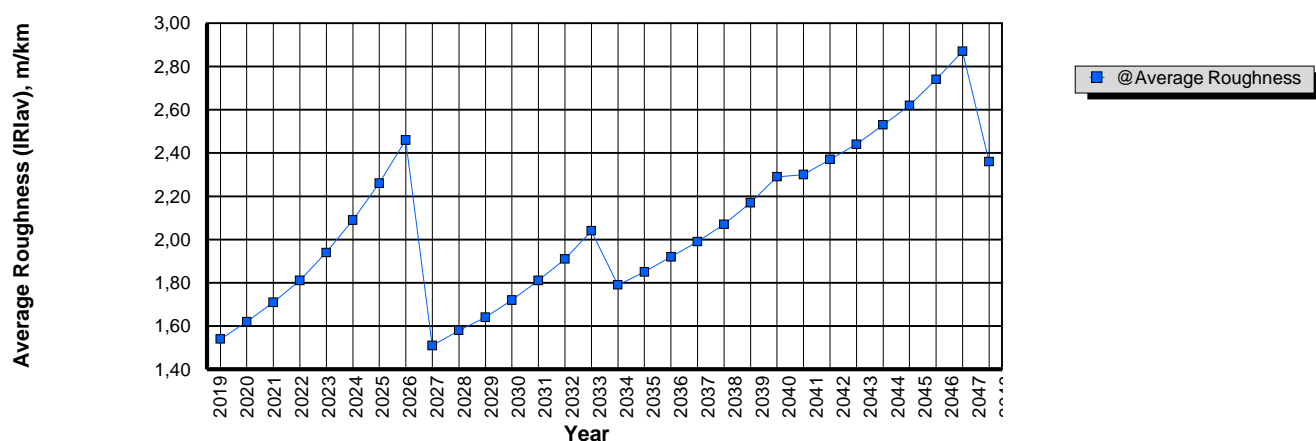
**Section:** Str 7-01 - LHS - 135000-142250  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted

Length: 6,75km    Width: 7,00m    Rise + Fall: 1,00m/km    Curvature: 3,00deg/km    Road Class: Primary or Trunk

**Progression of Cracking over time**  
(after works values)



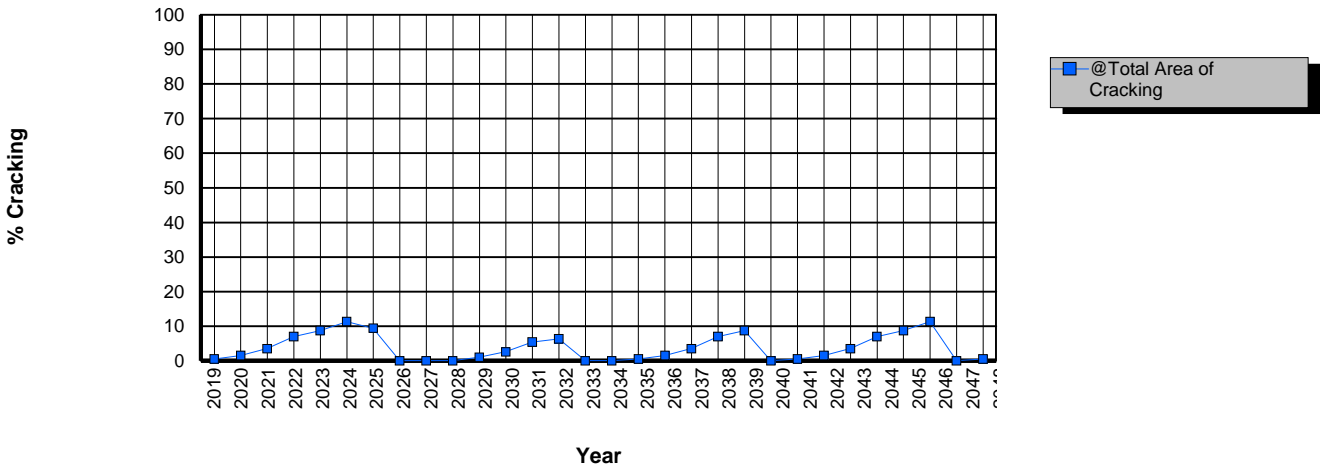
**Progression of Average Roughness over time**



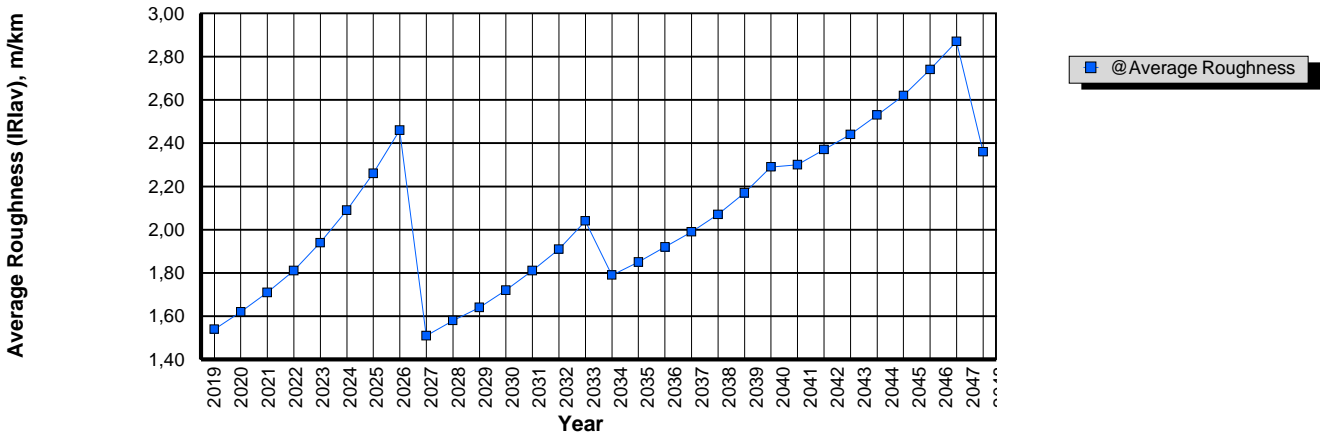
Section: Str 7-02 - LHS - 142250-152000  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 9,75km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)

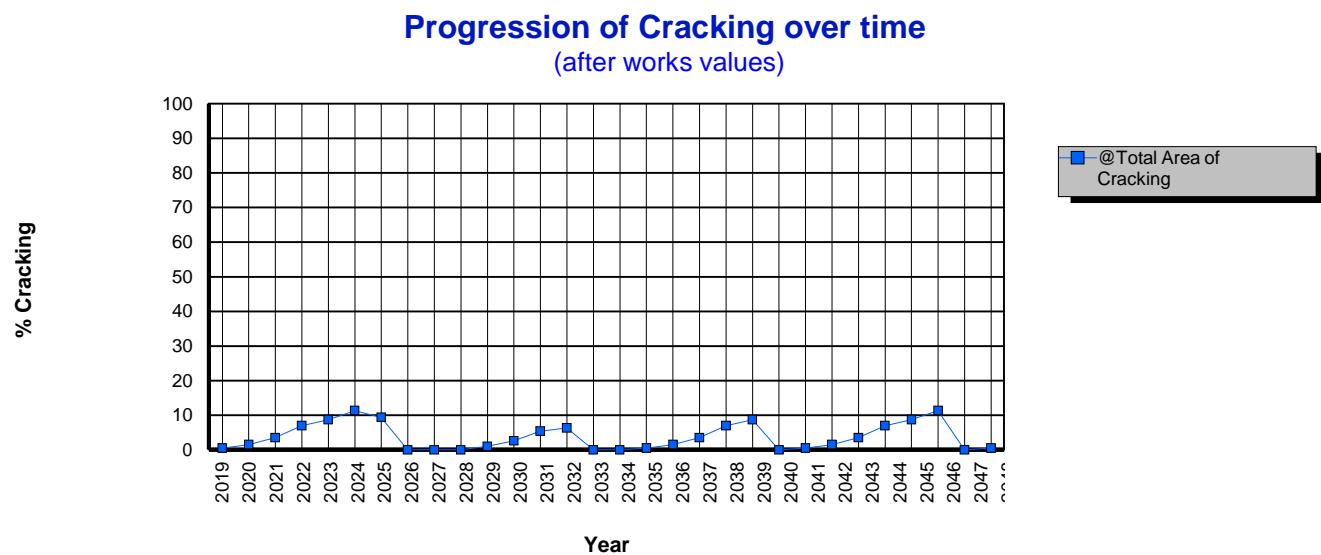


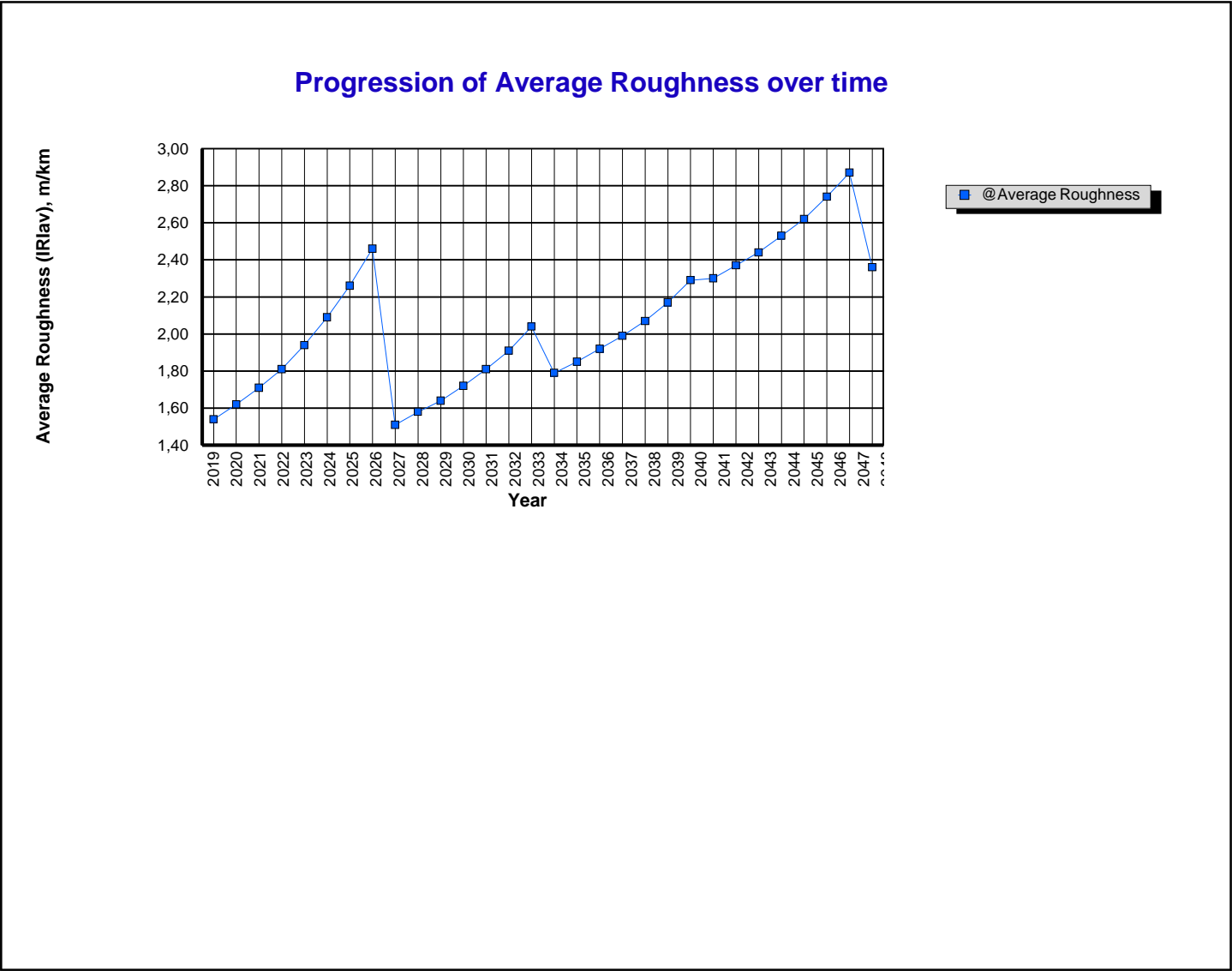
Progression of Average Roughness over time



**Section:** Str 7-03 - LHS - 152000-164500  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted

Length: 9,75km    Width: 7,00m    Rise + Fall: 1,00m/km    Curvature: 3,00deg/km    Road Class: Primary or Trunk



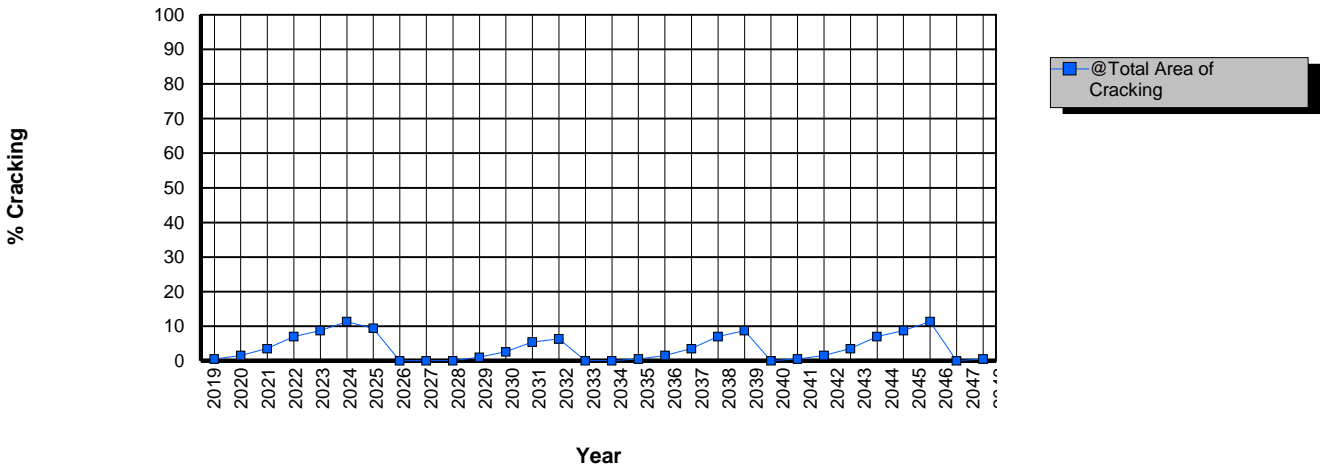




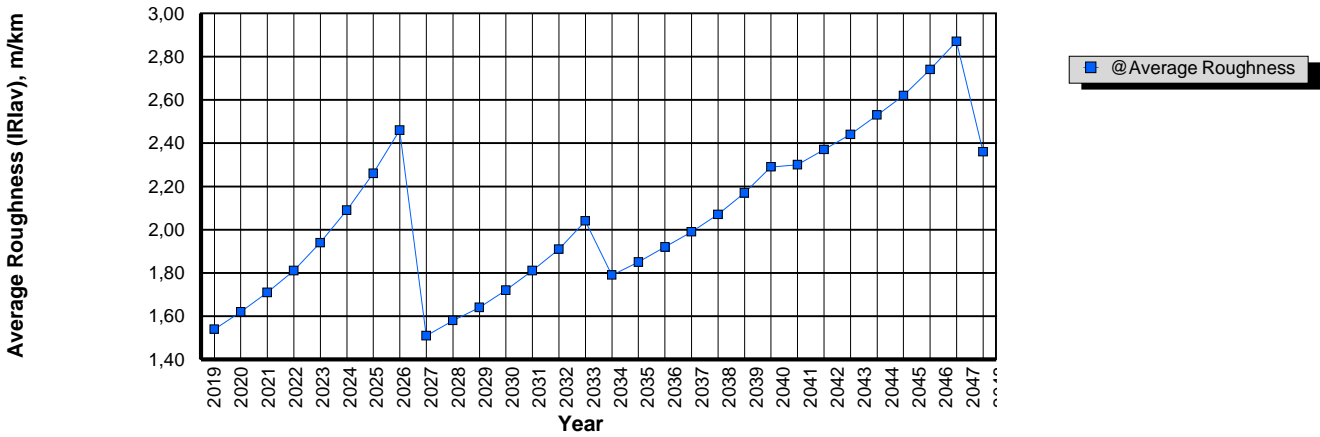
Section: Str 7-04 - LHS - 164500-175250  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 10,75km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)



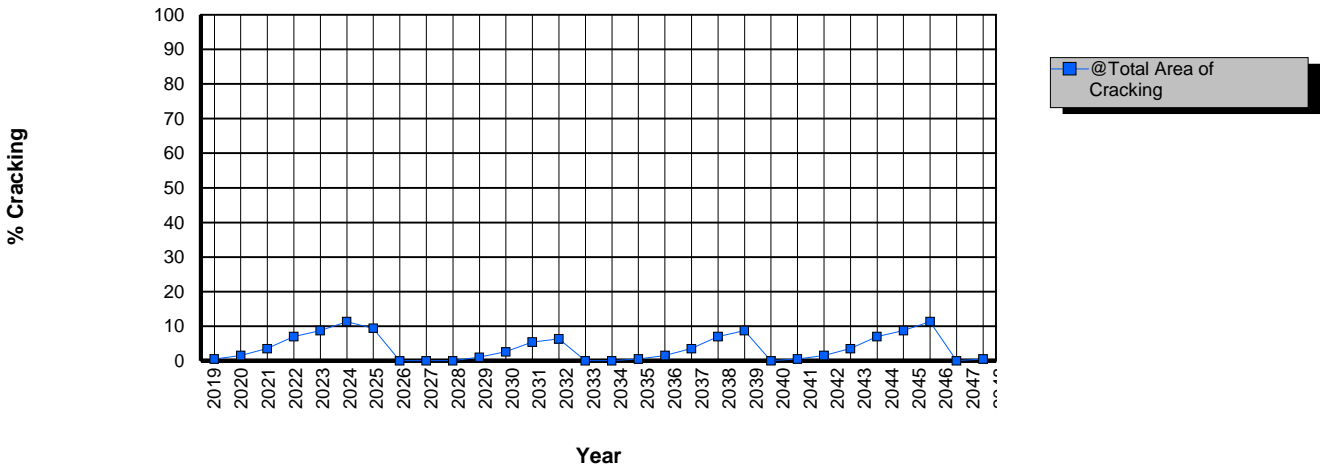
Progression of Average Roughness over time



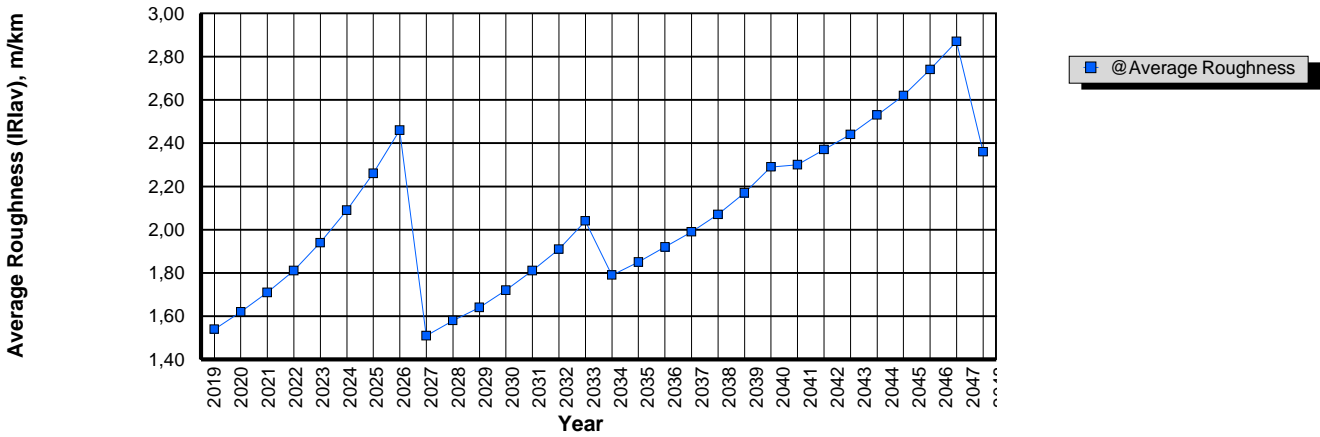
Section: Str 7-05 - LHS - 175250-185500  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 10,25km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)



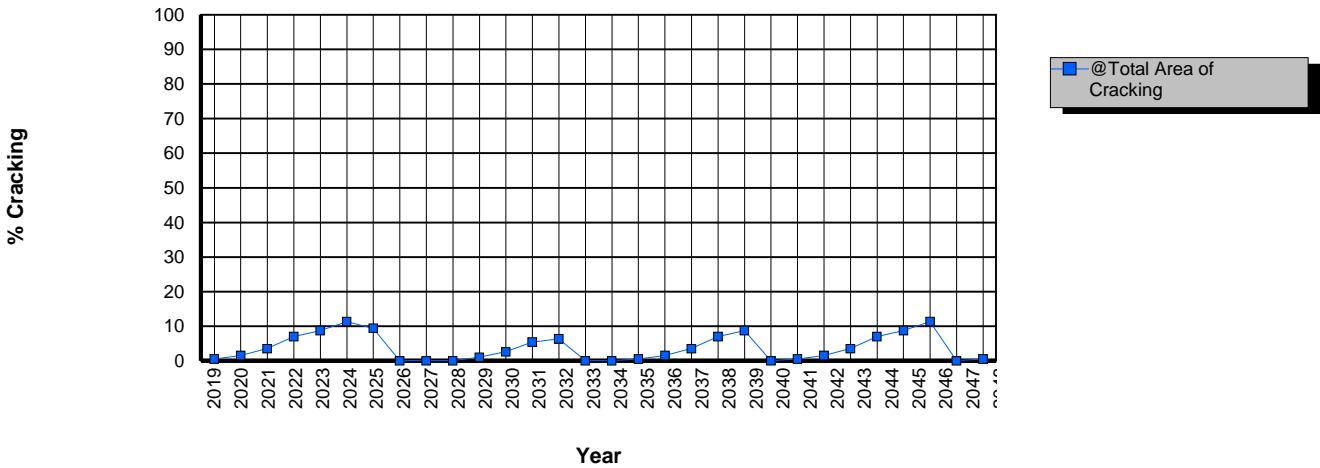
Progression of Average Roughness over time



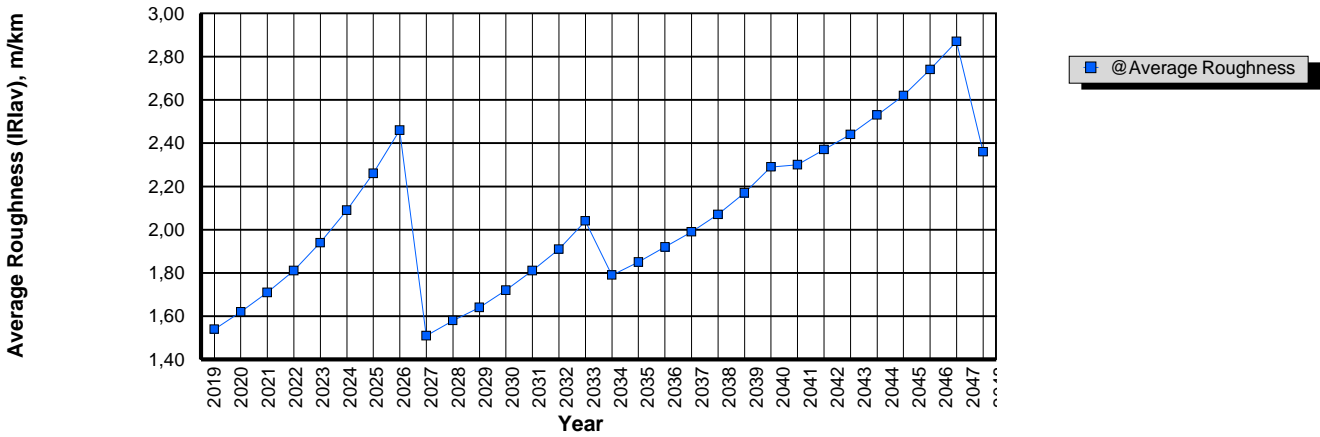
Section: Str 7-06 - LHS - 185500-207350  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 21,85km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)



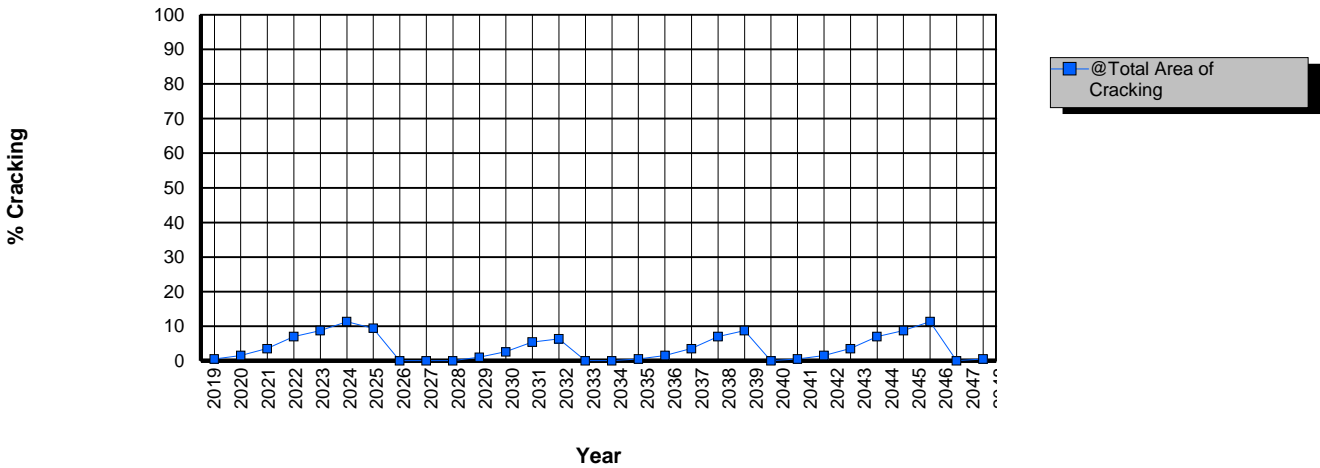
Progression of Average Roughness over time



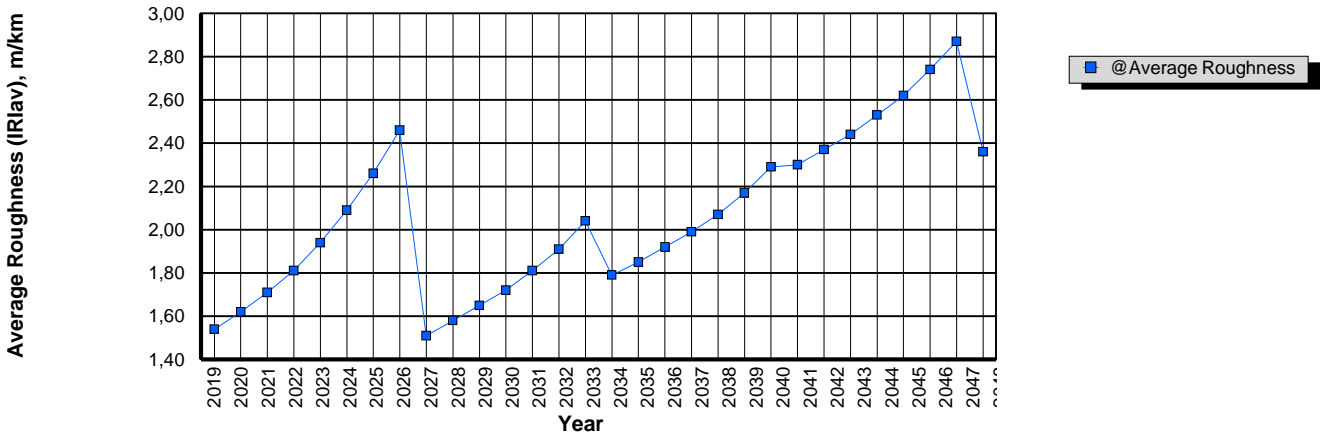
Section: Str 7-07 - LHS - 207350-211000  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 3,65km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)



Progression of Average Roughness over time



## Road Works Summary (by Section)

Study Name: **INDIA Str 7 LHS**

Run Date: **07-06-2018**

Currency: **Rupee**

Note: only sections that have works triggered are displayed.

**Section:** Str 7-01 - LHS - 135000-142250  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 6,75km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	1.715,00 sq. m
2024	Patching	Patch	0.0	0.0	1.715,00 sq. m
2025	Patching	Patch	0.0	0.0	4.448,08 sq. m
2026	Overlay 2026	O26	0.0	0.0	47.250,00 sq. m
2032	Patching	Patch	0.0	0.0	1.715,00 sq. m
2033	Overlay 2033	O33	0.0	0.0	47.250,00 sq. m
2039	Patching	Patch	0.0	0.0	1.715,00 sq. m
2040	Overlay 2040	O40	0.0	0.0	47.250,00 sq. m
2045	Patching	Patch	0.0	0.0	1.715,00 sq. m
2046	Patching	Patch	0.0	0.0	1.715,00 sq. m
2047	Overlay 2047	O47	0.0	0.0	47.250,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**Section:** Str 7-02 - LHS - 142250-152000  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 9,75km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	2.477,23 sq. m
2024	Patching	Patch	0.0	0.0	2.477,23 sq. m
2025	Patching	Patch	0.0	0.0	6.425,01 sq. m
2026	Overlay 2026	O26	0.0	0.0	68.250,00 sq. m
2032	Patching	Patch	0.0	0.0	2.477,23 sq. m
2033	Overlay 2033	O33	0.0	0.0	68.250,00 sq. m
2039	Patching	Patch	0.0	0.0	2.477,23 sq. m
2040	Overlay 2040	O40	0.0	0.0	68.250,00 sq. m
2045	Patching	Patch	0.0	0.0	2.477,23 sq. m
2046	Patching	Patch	0.0	0.0	2.477,23 sq. m
2047	Overlay 2047	O47	0.0	0.0	68.250,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**HDM - 4 Road Works Summary (by Section)**

**Section:** Str 7-03 - LHS - 152000-164500  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 9,75km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	2.477,23 sq. m
2024	Patching	Patch	0.0	0.0	2.477,23 sq. m
2025	Patching	Patch	0.0	0.0	6.425,01 sq. m
2026	Overlay 2026	O26	0.0	0.0	68.250,00 sq. m
2032	Patching	Patch	0.0	0.0	2.477,23 sq. m
2033	Overlay 2033	O33	0.0	0.0	68.250,00 sq. m
2039	Patching	Patch	0.0	0.0	2.477,23 sq. m
2040	Overlay 2040	O40	0.0	0.0	68.250,00 sq. m
2045	Patching	Patch	0.0	0.0	2.477,23 sq. m
2046	Patching	Patch	0.0	0.0	2.477,23 sq. m
2047	Overlay 2047	O47	0.0	0.0	68.250,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**HDM - 4 Road Works Summary (by Section)**

**Section:** Str 7-04 - LHS - 164500-175250  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 10,75km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	2.731,30 sq. m
2024	Patching	Patch	0.0	0.0	2.731,30 sq. m
2025	Patching	Patch	0.0	0.0	7.083,99 sq. m
2026	Overlay 2026	O26	0.0	0.0	75.250,00 sq. m
2032	Patching	Patch	0.0	0.0	2.731,30 sq. m
2033	Overlay 2033	O33	0.0	0.0	75.250,00 sq. m
2039	Patching	Patch	0.0	0.0	2.731,30 sq. m
2040	Overlay 2040	O40	0.0	0.0	75.250,00 sq. m
2045	Patching	Patch	0.0	0.0	2.731,30 sq. m
2046	Patching	Patch	0.0	0.0	2.731,30 sq. m
2047	Overlay 2047	O47	0.0	0.0	75.250,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**HDM - 4 Road Works Summary (by Section)**

**Section:** Str 7-05 - LHS - 175250-185500  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 10,25km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	2.604,27 sq. m
2024	Patching	Patch	0.0	0.0	2.604,27 sq. m
2025	Patching	Patch	0.0	0.0	6.754,50 sq. m
2026	Overlay 2026	O26	0.0	0.0	71.750,00 sq. m
2032	Patching	Patch	0.0	0.0	2.604,27 sq. m
2033	Overlay 2033	O33	0.0	0.0	71.750,00 sq. m
2039	Patching	Patch	0.0	0.0	2.604,27 sq. m
2040	Overlay 2040	O40	0.0	0.0	71.750,00 sq. m
2045	Patching	Patch	0.0	0.0	2.604,27 sq. m
2046	Patching	Patch	0.0	0.0	2.604,27 sq. m
2047	Overlay 2047	O47	0.0	0.0	71.750,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	



**HDM - 4 Road Works Summary (by Section)**

**Section:** Str 7-06 - LHS - 185500-207350  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 21,85km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	5.551,53 sq. m
2024	Patching	Patch	0.0	0.0	5.551,53 sq. m
2025	Patching	Patch	0.0	0.0	14.398,62 sq. m
2026	Overlay 2026	O26	0.0	0.0	152.950,00 sq. m
2032	Patching	Patch	0.0	0.0	5.551,53 sq. m
2033	Overlay 2033	O33	0.0	0.0	152.950,00 sq. m
2039	Patching	Patch	0.0	0.0	5.551,53 sq. m
2040	Overlay 2040	O40	0.0	0.0	152.950,00 sq. m
2045	Patching	Patch	0.0	0.0	5.551,53 sq. m
2046	Patching	Patch	0.0	0.0	5.551,53 sq. m
2047	Overlay 2047	O47	0.0	0.0	152.950,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**Section:** Str 7-07 - LHS - 207350-211000  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 3,65km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	927,37 sq. m
2024	Patching	Patch	0.0	0.0	927,37 sq. m
2025	Patching	Patch	0.0	0.0	2.405,26 sq. m
2026	Overlay 2026	O26	0.0	0.0	25.550,00 sq. m
2032	Patching	Patch	0.0	0.0	927,37 sq. m
2033	Overlay 2033	O33	0.0	0.0	25.550,00 sq. m
2039	Patching	Patch	0.0	0.0	927,37 sq. m
2040	Overlay 2040	O40	0.0	0.0	25.550,00 sq. m
2045	Patching	Patch	0.0	0.0	927,37 sq. m
2046	Patching	Patch	0.0	0.0	927,37 sq. m
2047	Overlay 2047	O47	0.0	0.0	25.550,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

### Summary of Total Annual Economic Costs :

#### Base Sensitivity Scenario

	Base Alternative
2023	0.00
2024	0.00
2025	0.00
2026	0.00
2032	0.00
2033	0.00
2039	0.00
2040	0.00
2045	0.00
2046	0.00
2047	0.00
Total	0,00

**Section:** Str 7-01 - RHS - 135000-162350

**Alternative:** Base Alternative

**Sensitivity:** No Sensitivity Analysis Conducted

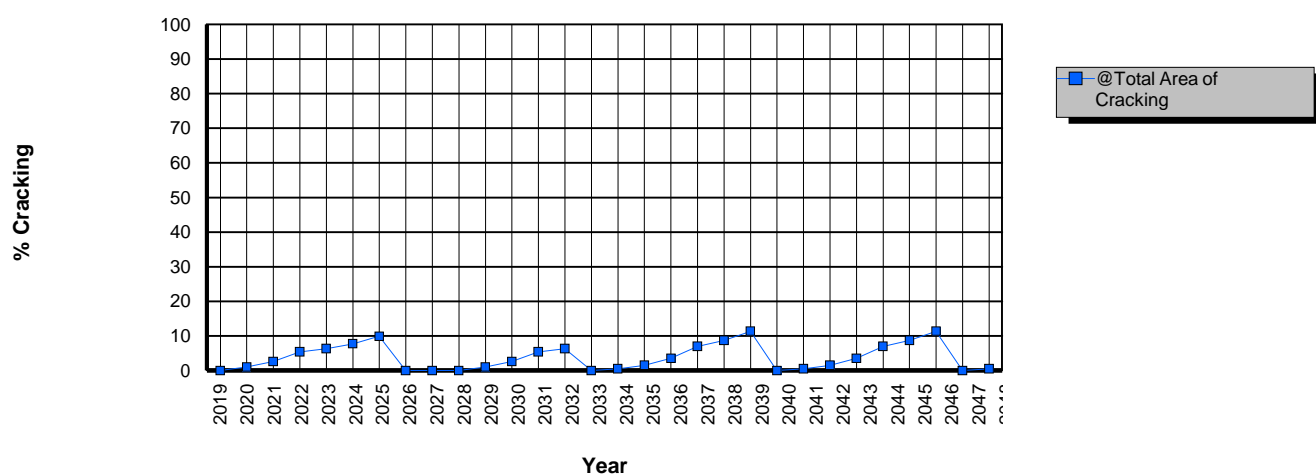
Length: 26,85km Width: 7,00m

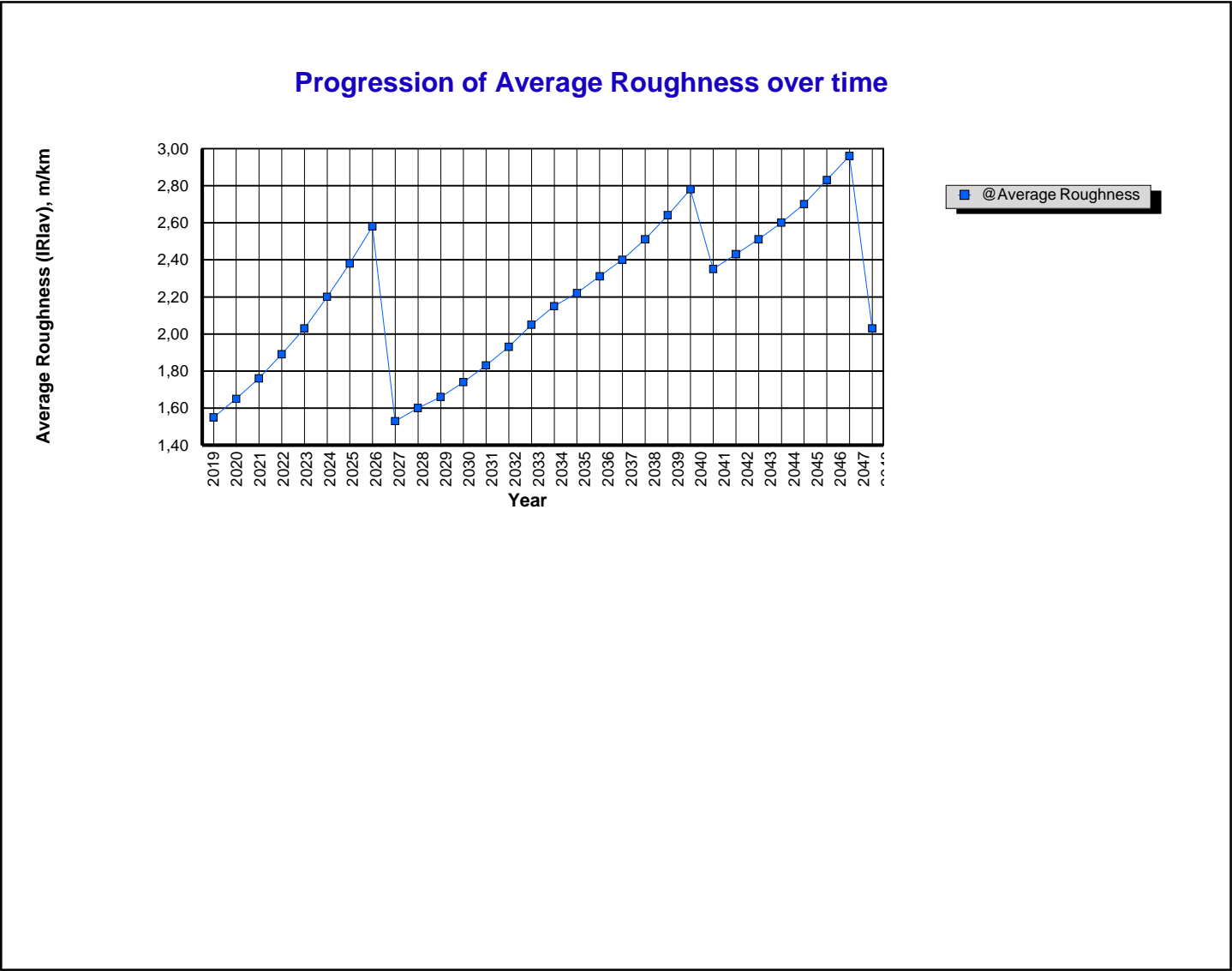
Rise + Fall: 1,00m/km

Curvature: 3,00deg/km

oad Class: Primary or Trunk

**Progression of Cracking over time**  
(after works values)

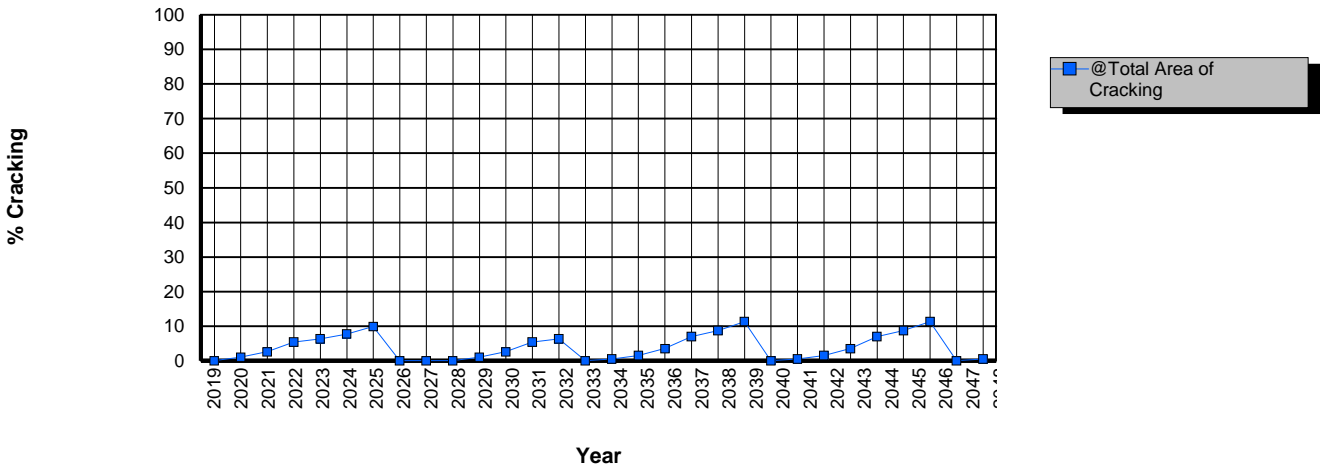




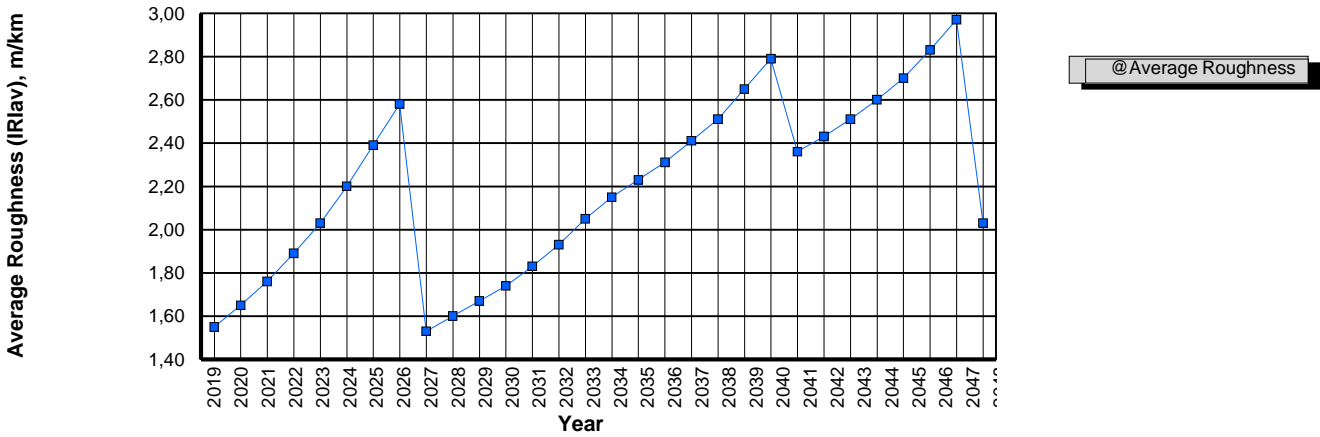
Section: Str 7-02 - RHS - 162350-178500  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 16,15km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)

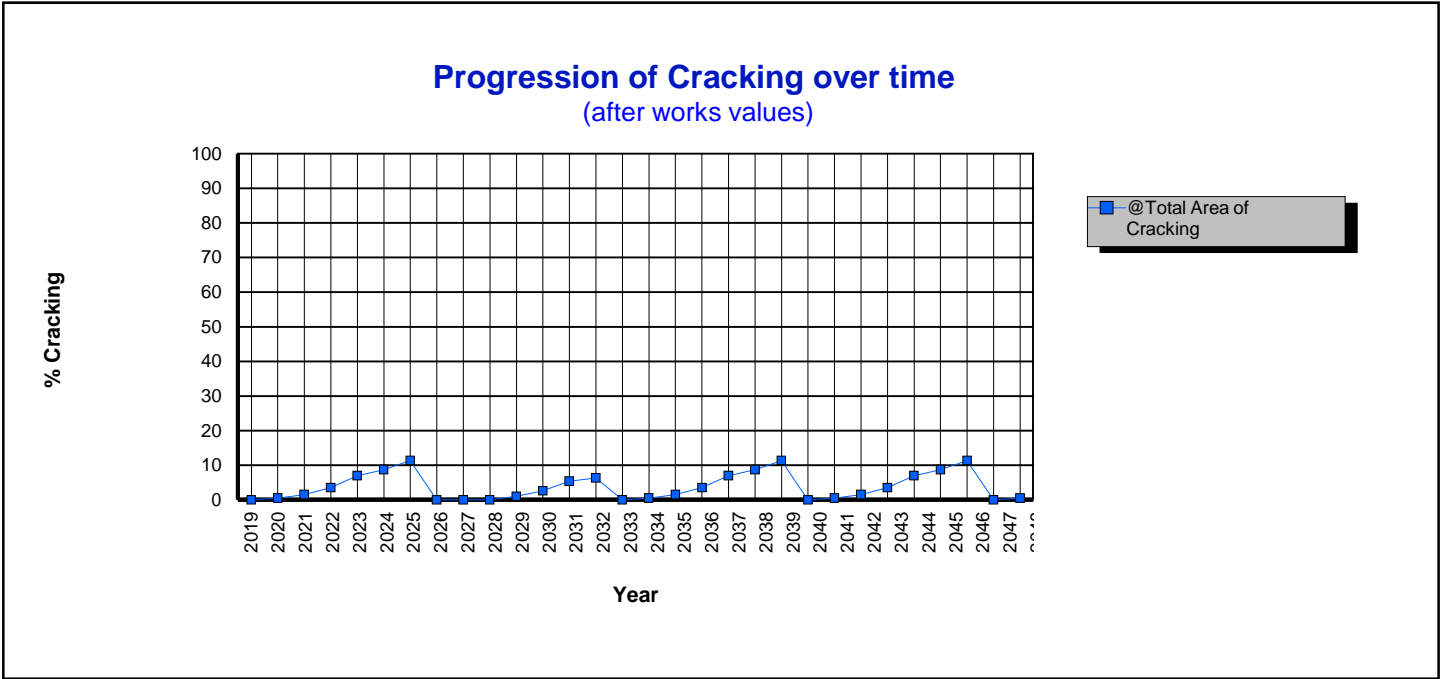


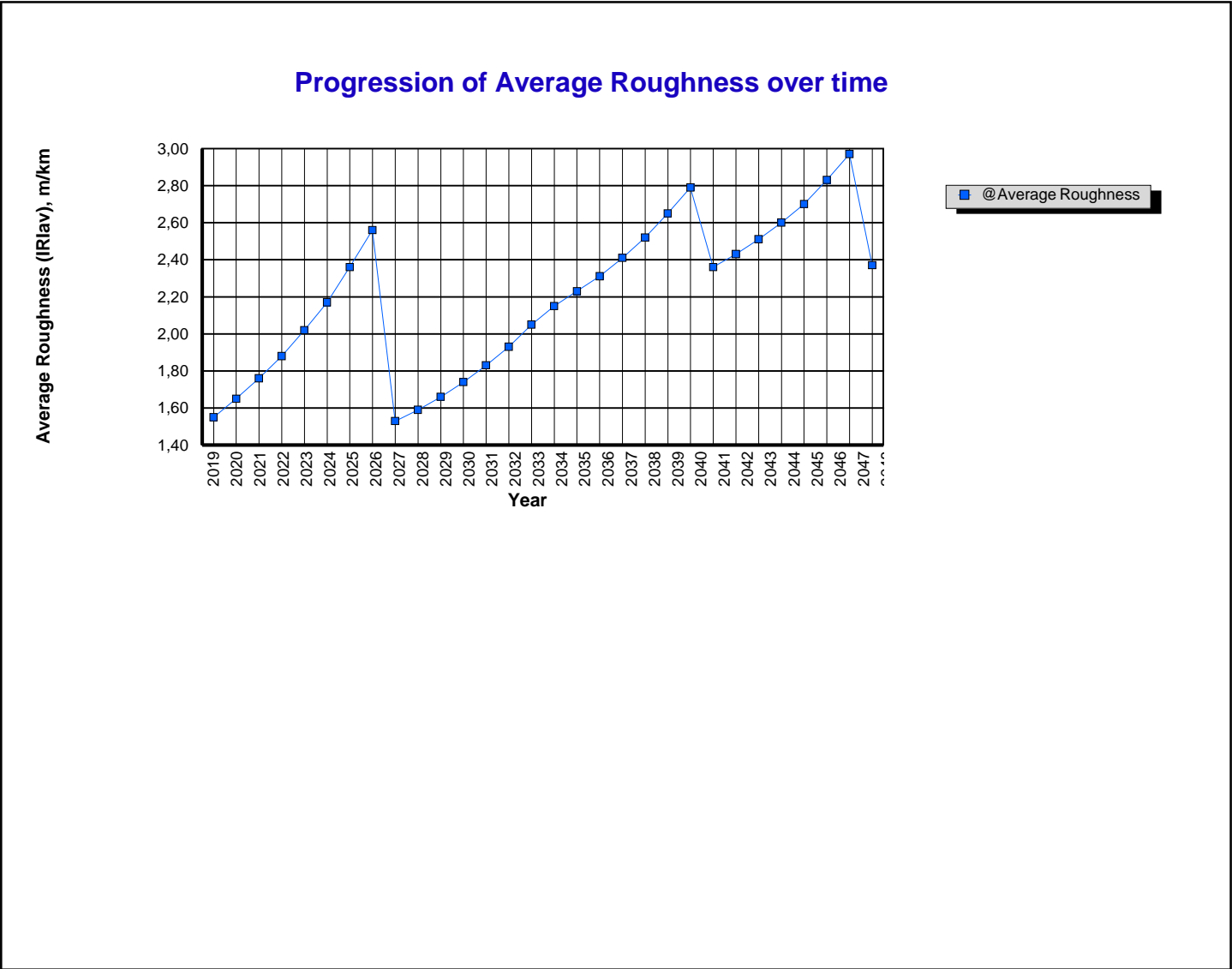
Progression of Average Roughness over time



Section: Str 7-03 - RHS - 178500-197850  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 19,35km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

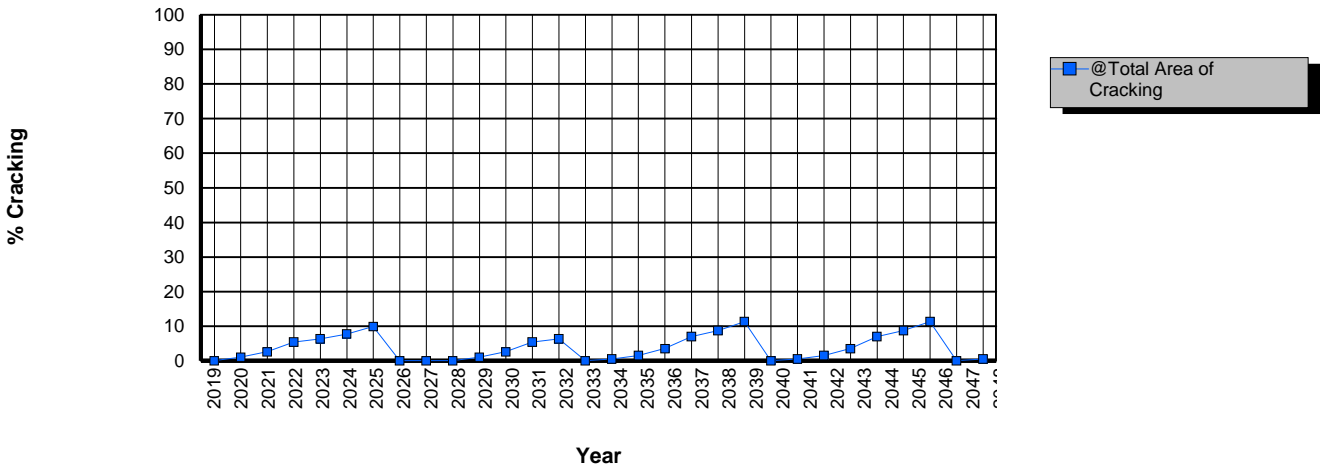




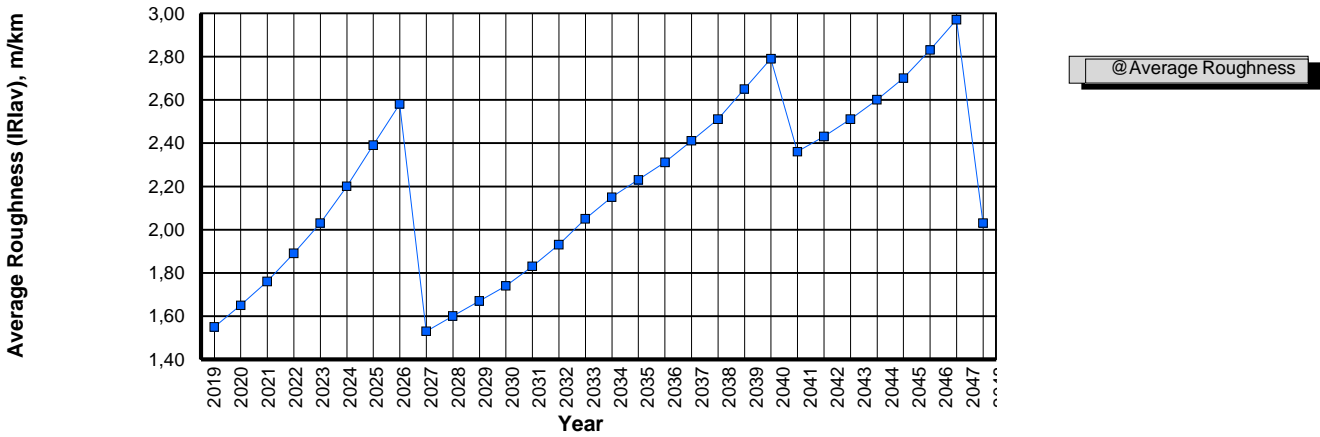
Section: Str 7-04 - RHS - 197850-210950  
Alternative: Base Alternative  
Sensitivity: No Sensitivity Analysis Conducted

Length: 13,10km Width: 7,00m Rise + Fall: 1,00m/km Curvature: 3,00deg/km Road Class: Primary or Trunk

Progression of Cracking over time  
(after works values)



Progression of Average Roughness over time





## Road Works Summary (by Section)

Study Name: **INDIA Str 7 RHS**

Run Date: **07-06-2018**

Currency: **Rupee**

Note: only sections that have works triggered are displayed.

**Section:** Str 7-01 - RHS - 135000-162350  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 26,85km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	6.821,91 sq. m
2024	Patching	Patch	0.0	0.0	6.821,91 sq. m
2025	Patching	Patch	0.0	0.0	6.821,91 sq. m
2026	Overlay 2026	O26	0.0	0.0	187.950,00 sq. m
2032	Patching	Patch	0.0	0.0	6.821,91 sq. m
2033	Overlay 2033	O33	0.0	0.0	187.950,00 sq. m
2038	Patching	Patch	0.0	0.0	6.821,91 sq. m
2039	Patching	Patch	0.0	0.0	6.821,91 sq. m
2040	Overlay 2040	O40	0.0	0.0	187.950,00 sq. m
2045	Patching	Patch	0.0	0.0	6.821,91 sq. m
2046	Patching	Patch	0.0	0.0	6.821,91 sq. m
2047	Milling and Overlay 2047	MO47	0.0	0.0	187.950,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**Section:** Str 7-02 - RHS - 162350-178500  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 16,15km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	4.103,31 sq. m
2024	Patching	Patch	0.0	0.0	4.103,31 sq. m
2025	Patching	Patch	0.0	0.0	4.103,31 sq. m
2026	Overlay 2026	O26	0.0	0.0	113.050,00 sq. m
2032	Patching	Patch	0.0	0.0	4.103,31 sq. m
2033	Overlay 2033	O33	0.0	0.0	113.050,00 sq. m
2038	Patching	Patch	0.0	0.0	4.103,31 sq. m
2039	Patching	Patch	0.0	0.0	4.103,31 sq. m
2040	Overlay 2040	O40	0.0	0.0	113.050,00 sq. m
2045	Patching	Patch	0.0	0.0	4.103,31 sq. m
2046	Patching	Patch	0.0	0.0	4.103,31 sq. m
2047	Milling and Overlay 2047	MO47	0.0	0.0	113.050,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

<b>Section:</b>	Str 7-03 - RHS - 178500-197850	<b>Road Class:</b> Primary or Trunk <b>Width:</b> 7,00m
<b>Alternative:</b>	Base Alternative	
<b>Sensitivity:</b>	No Sensitivity Analysis Conducted	
<b>Surface Class:</b>	Bituminous	
<b>Length:</b>	19,35km	

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2024	Patching	Patch	0.0	0.0	4.916,35 sq. m
2025	Patching	Patch	0.0	0.0	4.916,35 sq. m
2026	Overlay 2026	O26	0.0	0.0	135.450,00 sq. m
2032	Patching	Patch	0.0	0.0	4.916,35 sq. m
2033	Overlay 2033	O33	0.0	0.0	135.450,00 sq. m
2038	Patching	Patch	0.0	0.0	4.916,35 sq. m
2039	Patching	Patch	0.0	0.0	4.916,35 sq. m
2040	Overlay 2040	O40	0.0	0.0	135.450,00 sq. m
2045	Patching	Patch	0.0	0.0	4.916,35 sq. m
2046	Patching	Patch	0.0	0.0	4.916,35 sq. m
2047	Overlay 2047	O47	0.0	0.0	135.450,00 sq. m
Total cost for the section:			0.0	0.0	

**HDM - 4 Road Works Summary (by Section)**

**Section:** Str 7-04 - RHS - 197850-210950  
**Alternative:** Base Alternative  
**Sensitivity:** No Sensitivity Analysis Conducted  
**Surface Class:** Bituminous  
**Length:** 13,10km

**Road Class:** Primary or Trunk  
**Width:** 7,00m

Year	Description	Code	Economic Cost	Financial Cost	Work Quantity
2023	Patching	Patch	0.0	0.0	3.328,38 sq. m
2024	Patching	Patch	0.0	0.0	3.328,38 sq. m
2025	Patching	Patch	0.0	0.0	3.328,38 sq. m
2026	Overlay 2026	O26	0.0	0.0	91.700,00 sq. m
2032	Patching	Patch	0.0	0.0	3.328,38 sq. m
2033	Overlay 2033	O33	0.0	0.0	91.700,00 sq. m
2038	Patching	Patch	0.0	0.0	3.328,38 sq. m
2039	Patching	Patch	0.0	0.0	3.328,38 sq. m
2040	Overlay 2040	O40	0.0	0.0	91.700,00 sq. m
2045	Patching	Patch	0.0	0.0	3.328,38 sq. m
2046	Patching	Patch	0.0	0.0	3.328,38 sq. m
2047	Milling and Overlay 2047	MO47	0.0	0.0	91.700,00 sq. m
<b>Total cost for the section:</b>			0.0	0.0	

**Summary of Total Annual Economic Costs :****Base Sensitivity Scenario**

	Base Alternative
2023	<b>0.00</b>
2024	<b>0.00</b>
2025	<b>0.00</b>
2026	<b>0.00</b>
2032	<b>0.00</b>
2033	<b>0.00</b>
2038	<b>0.00</b>
2039	<b>0.00</b>
2040	<b>0.00</b>
2045	<b>0.00</b>
2046	<b>0.00</b>
2047	<b>0.00</b>
Total	<b>0,00</b>

## ANNEXURE 7 AAHSTO-HDM CALCULATIONS RESULTS

STRETCH 7. LHS # HDM-4 ID	Geometry				Current structural condition (2018)			
	Section	From	To	Length (m)	Average Deflection (mm <sup>-2</sup> )	Normalized Deflection to HDM (mm <sup>-2</sup> )	SN before works	Old BT thickness (mm)
Str 7-01 - LHS	1	135+500	142+250	6750	15	18	9.30	200
Str 7-02 - LHS	2	142+250	152+000	9750	14	17	9.72	195
Str 7-03 - LHS	3	152+000	164+500	12500	16	20	8.93	210
Str 7-04 - LHS	4	164+500	175+250	10750	16	20	8.93	200
Str 7-05 - LHS	5	175+250	185+500	10250	18	22	8.29	195
Str 7-06 - LHS	6	185+500	207+350	21850	16	20	8.93	210
Str 7-07 - LHS	7	207+350	211+000	3650	18	22	8.29	230

STRETCH 7. LHS # HDM-4 ID	Proposed Overlay (2019)						MSA/day (2019)
	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional	
Str 7-01 - LHS	0	30	0	30	9.80	Functional	22997
Str 7-02 - LHS	0	30	0	30	10.21	Functional	22997
Str 7-03 - LHS	0	30	0	30	9.43	Structural	22997
Str 7-04 - LHS	0	30	0	30	9.43	Structural	22997
Str 7-05 - LHS	0	30	0	30	8.79	Structural	22997
Str 7-06 - LHS	0	30	0	30	9.43	Structural	22997
Str 7-07 - LHS	0	30	0	30	8.79	Functional	22997

STRETCH 7. LHS # HDM-4 ID	Proposed Work (2026)								
	MSA 2026 -2035	SN before works	Required SN 2026 - 2035	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - LHS	152.92	6.68	7.86	0	30	50	80	7.95	Structural
Str 7-02 - LHS	152.92	6.68	7.86	0	30	50	80	7.95	Structural
Str 7-03 - LHS	152.92	6.67	7.86	0	30	50	80	7.94	Structural
Str 7-04 - LHS	152.92	6.68	7.86	0	30	50	80	7.95	Structural
Str 7-05 - LHS	152.92	6.68	7.86	0	30	50	80	7.95	Structural
Str 7-06 - LHS	152.92	6.67	7.86	0	30	50	80	7.94	Structural
Str 7-07 - LHS	152.92	6.66	7.86	0	30	50	80	7.93	Structural

STRETCH 7. LHS # HDM-4 ID	Proposed Work (2033)								
	MSA 2033-2042	SN before works	Required SN 2033 - 2042	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - LHS	278.66	7.89	8.46	0	30	30	60	8.84	Structural
Str 7-02 - LHS	278.66	7.89	8.46	0	30	30	60	8.85	Structural
Str 7-03 - LHS	278.66	7.89	8.46	0	30	30	60	8.84	Structural
Str 7-04 - LHS	278.66	7.89	8.46	0	30	30	60	8.84	Structural
Str 7-05 - LHS	278.66	7.89	8.46	0	30	30	60	8.85	Structural
Str 7-06 - LHS	278.66	7.89	8.46	0	30	30	60	8.84	Structural
Str 7-07 - LHS	278.66	7.88	8.46	0	30	30	60	8.83	Structural



STRETCH 7. LHS # HDM-4 ID	Proposed Work (2040)								
	MSA 2040 -2049	SN before works	Required SN 2040 - 2049	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - LHS	511.11	8.77	9.11	0	30	0	30	9.30	Structural
Str 7-02 - LHS	511.11	8.78	9.11	0	30	0	30	9.31	Structural
Str 7-03 - LHS	511.11	8.77	9.11	0	30	0	30	9.30	Structural
Str 7-04 - LHS	511.11	8.77	9.11	0	30	0	30	9.30	Structural
Str 7-05 - LHS	511.11	8.78	9.11	0	30	0	30	9.31	Structural
Str 7-06 - LHS	511.11	8.77	9.11	0	30	0	30	9.30	Structural
Str 7-07 - LHS	511.11	8.76	9.11	0	30	0	30	9.29	Structural

STRETCH 7. LHS # HDM-4 ID	Proposed Work (2047)								
	MSA 2047 -2056	SN before works	Required SN 2047 - 2056	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - LHS	778.13	9.22	9.58	0	30	0	30	9.77	Structural
Str 7-02 - LHS	778.13	9.23	9.58	0	30	0	30	9.77	Structural
Str 7-03 - LHS	778.13	9.22	9.58	0	30	0	30	9.77	Structural
Str 7-04 - LHS	778.13	9.22	9.58	0	30	0	30	9.77	Structural
Str 7-05 - LHS	778.13	9.23	9.58	0	30	0	30	9.77	Structural
Str 7-06 - LHS	778.13	9.22	9.58	0	30	0	30	9.77	Structural
Str 7-07 - LHS	778.13	9.21	9.58	0	30	0	30	9.76	Structural

STRETCH 7. RHS # HDM-4 ID	Geometry				Current structural condition (2018)			
	Section	From	To	Length (m)	Average Deflection (mm <sup>-2</sup> )	Normalized Deflection to HDM (mm <sup>-2</sup> )	SN before works	Old BT thickness (mm)
Str 7-01 - RHS	1	135+500	162+350	26850	14	17	9.72	180
Str 7-02 - RHS	2	162+350	178+500	16150	16	20	8.93	200
Str 7-03 - RHS	3	178+500	197+850	19350	19	23	8.02	175
Str 7-04 - RHS	4	197+850	210+950	13100	15	18	9.30	200

STRETCH 7. RHS # HDM-4 ID	Proposed Overlay (2019)						MSA/day (2019)
	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional	
Str 7-01 - RHS	0	40	0	40	10.38	Structural	37790
Str 7-02 - RHS	0	40	0	40	9.60	Structural	37790
Str 7-03 - RHS	0	30	40	70	8.51	Structural	37790
Str 7-04 - RHS	0	40	0	40	9.97	Structural	37790

STRETCH 7. RHS # HDM-4 ID	Proposed Work (2026)								
	MSA 2026 -2035	SN before works	Required SN 2026 - 2035	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - RHS	152.59	6.68	7.86	0	30	50	80	7.95	Structural
Str 7-02 - RHS	152.59	6.67	7.86	0	30	50	80	7.94	Structural
Str 7-03 - RHS	152.59	6.64	7.86	0	30	50	80	7.92	Structural
Str 7-04 - RHS	152.59	6.67	7.86	0	30	50	80	7.94	Structural

STRETCH 7. RHS # HDM-4 ID	Proposed Work (2033)								
	MSA 2033-2042	SN before works	Required SN 2033 - 2042	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - RHS	207.54	7.89	8.16	0	30	0	30	8.41	Structural
Str 7-02 - RHS	207.54	7.88	8.16	0	30	0	30	8.40	Structural
Str 7-03 - RHS	207.54	7.86	8.16	0	30	0	30	8.38	Structural
Str 7-04 - RHS	207.54	7.88	8.16	0	30	0	30	8.40	Structural

STRETCH 7. RHS # HDM-4 ID	Proposed Work (2040)								
	MSA 2040 -2049	SN before works	Required SN 2040 - 2049	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - RHS	301.79	8.33	8.55	0	30	0	30	8.87	Structural
Str 7-02 - RHS	301.79	8.32	8.55	0	30	0	30	8.87	Structural
Str 7-03 - RHS	301.79	8.30	8.55	0	30	0	30	8.85	Structural
Str 7-04 - RHS	301.79	8.32	8.55	0	30	0	30	8.87	Structural

STRETCH 7. RHS # HDM-4 ID	Proposed Work (2047)								
	MSA 2047 -2056	SN before works	Required SN 2047 - 2056	Milling (mm)	BC (a1=0,42) (mm)	DBM (a2=0,40) (mm)	Total overlay thickness (mm)	SN after works	Structural/ Functional
Str 7-01 - RHS	432.24	8.80	8.93	30	30	0	0	8.95	Structural
Str 7-02 - RHS	432.24	8.79	8.93	30	30	0	0	8.95	Structural
Str 7-03 - RHS	432.24	8.77	8.93	0	30	0	30	9.31	Structural
Str 7-04 - RHS	432.24	8.79	8.93	30	30	0	0	8.95	Structural



## ANNEXURE 8 STRUCTURES

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Type	No. of Span	Width	Condition of Protection work	Condition of Structure	Remark
1	136.263	RCC Box	2	3.0x2.0	Good	Good	Overall condition of structure is good
2	136.42	RCC Box	2	3.0x3.0	Good	Good	Overall condition of structure is good
3	136.947	RCC Box	2	2.5x2.5	Good	Good	Overall condition of structure is good
4	137.606	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
5	137.966	RCC Box	1	1.5x1.5	Good	Good	Cleaning of vegetation
6	138.486	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
7	138.745	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
8	139.272	RCC Box	1	2.0x1.5	Good	Good	Cleaning of vegetation
9	139.688	RCC Box	1	2.8x1.5	Good	Good	Cleaning of vegetation
10	139.688	RCC Box	1	3.0x2.5	Good	Good	Overall condition of structure is good
11	140.28	RCC Box	2	3.0x3.0	Good	Good	Cleaning of vegetation
12	142.055	RCC Box	2	3.0x2.0	Good	Good	Overall condition of structure is good
13	143.11	RCC Box	2	3.0x3.0	Good	Good	Overall condition of structure is good
14	153.06	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
15	155.292	RCC Box	1	1.0x6.0	Good	Good	Cleaning of water way
16	156.582	RCC Box	1	1.0x1.8	Good	Good	Cleaning of water way

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Type	No. of Span	Width	Condition of Protection work	Condition of Structure	Remark
17	158.746	RCC Box	1	2.0x1.5	Good	Good	Cleaning of vegetation
18	163.029	RCC Box	1	2.0x2.0	Good	Good	Cleaning of vegetation
19	163.896	RCC Box	1	3.0x2.5	Good	Good	Overall condition of structure is good
20	164.097	RCC Box	1	2.0x2.0	Good	Good	Overall condition of structure is good
21	164.498	RCC Box	1	2.0x2.0	Good	Good	Overall condition of structure is good
22	164.647	RCC Box	1	2.0x2.0	Good	Good	Overall condition of structure is good
23	164.944	RCC Box	2	2.0x2.0	Good	Good	Overall condition of structure is good
24	165.526	RCC Box	1	1.0x1.20	Good	Good	Overall condition of structure is good
25	167.075	RCC Box	2	2.0x1.5	Good	Good	Overall condition of structure is good
26	168.705	RCC Box	2	2.0x1.5	Good	Good	Overall condition of structure is good
27	170.972	RCC Box	1	2.0x1.5	Good	Good	Overall condition of structure is good
28	171.28	RCC Box	1	1.0x1.80	Good	Good	Overall condition of structure is good
29	171.413	RCC Box	1	3.0x1.5	Good	Good	Overall condition of structure is good
30	171.485	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
31	173.138	RCC Box	1	2.5x2.0	Good	Good	Overall condition of structure is good
32	175.131	RCC Box	1	2x1.8	Good	Good	Overall condition of structure is good
33	175.312	RCC Box	2	2x18.0	Good	Good	Cleaning of vegetation

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Type	No. of Span	Width	Condition of Protection work	Condition of Structure	Remark
34	175.572	RCC Box	1	1.5x1.5	Good	Good	Overall condition of structure is good
35	175.698	RCC Box	1	1x4.10	Good	Good	Cleaning of vegetation
36	176.134	RCC Box	1	2.8x2.0	Good	Good	Overall condition of structure is good
37	177.743	RCC Box	2	2.5x2.5	-	Poor	Cleaning of vegetation
38	178.905	RCC Box	1	1.5x1.5	Good	Good	Cleaning of vegetation
39	178.968	RCC Box	2	3.0x2.0	Good	Good	Overall condition of structure is good
40	181.2	RCC Box	2	3.0x2.0	Good	Good	Overall condition of structure is good
41	181.513	RCC Box	1	3.0x1.6	Good	Good	Cleaning of water way surface and vegetation
42	181.83	RCC Box	1	2.0x2.0	Good	Good	Cleaning of water way surface
43	182.173	RCC Box	1	1.5x1.5	Good	Good	Cleaning of water way surface and vegetation
44	184.864	RCC Box	2	3.0x2.5	Good	Good	Cleaning of water way surface and vegetation
45	185.163	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
46	185.43	RCC Box	1	3.0x2.0	Fair	Fair	Overall condition of structure is good
47	185.738	RCC Box	1	3.0x2.0	Fair	Fair	Overall condition of structure is good
48	186.1	RCC Box	2	3.0x2.0	Fair	Fair	Overall condition of structure is good

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Type	No. of Span	Width	Condition of Protection work	Condition of Structure	Remark
49	187.012	RCC Box	1	2.0x2.0	Fair	Fair	Overall condition of structure is good
50	187.903	RCC Box	1	3.0x2.0	Fair	Fair	Overall condition of structure is good
51	188.095	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
52	188.358	RCC Box	2	2.5x2.0	Fair	Fair	Overall condition of structure is good
53	188.958	RCC Box	1	2.0x2.0	Fair	Fair	Overall condition of structure is good
54	189.522	RCC Box	2	2.0x2.4	Fair	Fair	Overall condition of structure is good
55	190.135	RCC Box	1	1x2.4	Fair	Fair	Overall condition of structure is good
56	190.175	RCC Box	2	2x2.4	Fair	Fair	Overall condition of structure is good
57	190.767	RCC Box	2	3.0x2.0	Fair	Fair	Overall condition of structure is good
58	191.311	RCC Box	2	2.5x2.5	Fair	Fair	Overall condition of structure is good
59	192.155	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
60	192.322	RCC Box	3	1x1.8	Fair	Fair	Cleaning of water way
61	193.316	RCC Box	2	3.0x3.0	Fair	Fair	Cleaning of water way
62	194.181	RCC Box	1	1x1.5	Fair	Fair	Cleaning of water way
63	194.856	RCC Box	2	2.5x2.0	Fair	Fair	Overall condition of structure is good
64	196.465	RCC Box	1	2.8x1.5	Fair	Fair	Overall condition of structure is good
65	196.842	RCC Box	1	2.8x1.5	Fair	Fair	Overall condition of structure is good

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Type	No. of Span	Width	Condition of Protection work	Condition of Structure	Remark
66	197.087	RCC Box	2	1.5x1.5	Fair	Fair	Overall condition of structure is good
67	197.243	RCC Box	1	2.0x2.0	Fair	Fair	Overall condition of structure is good
68	198.265	RCC Box	2	1.5x2.0	Fair	Fair	Overall condition of structure is good
69	198.596	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
70	198.845	RCC Box	1	2.5x2.0	Fair	Fair	Overall condition of structure is good
71	199.009	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
72	199.812	RCC Box	1	1.5x1.5	Fair	Fair	Overall condition of structure is good
73	204.869	RCC Box	1	1x2.85	Fair	Fair	Cleaning of water way
74	205.325	RCC Box	1	1x3.0	Fair	Fair	Cleaning of water way
75	205.873	RCC Box	1	1x1.6	Fair	Fair	Cleaning of water way
76	206.589	RCC Box	1	1x3.0	Fair	Fair	Overall condition of structure is good
77	207.78	RCC Box	1	1x3.0	Fair	Fair	Overall condition of structure is good
78	209.065	RCC Box	1	1x2.7	Fair	Fair	Overall condition of structure is good
79	210.582	RCC Box	1	1x3.0	Fair	Fair	Overall condition of structure is good

## PIPE CULVERT

S.No	Chainage	Span Arrangement	Dia. Of Pipe	Condition of Protection Work	Condition of Structure	Remark
1	136.711	1	1	Good	Good	Pipe is half covered with silt and vegetation, need to clean and improvement of stone pitching
2	138.457	1	1	Good	Good	Cleaning of vegetation and stone pitching required
3	139.152	1	1	Good	Good	Overall condition is good
4	139.622	1	1	Good	Good	Cleaning of water way and vegetation
5	140.155	1	1	Good	Good	Overall condition is good
6	140.527	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
7	140.638	1	1	Good	Good	Cleaning of vegetation
8	141	1	1	Good	Good	Cleaning of vegetation
9	142.031	1	1	Good	Good	Overall condition is good
10	142.351	3	1.2	Good	Good	Pipe is fully covered with silt and vegetation , need to clean
11	143.269	2	1.2	Good	Good	Pipe is half covered with silt and vegetation, need to clean and improvement of stone pitching
12	144.131	1	1	Good	Good	Improvement of stone pitching and cleaning of vegetation
13	144.654	1	1	Good	Good	Improvement of stone pitching
14	144.69	1	1	Good	Good	Pipe is half covered with silt and vegetation, need to clean and improvement of stone pitching
15	144.746	1	1	Good	Good	Cleaning of water wayand vegetation, improvement of stone pitching
16	145.227	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
17	145.584	1	1	Good	Good	Improvement of stone pitching
18	145.593	1	1	Good	Good	Overall condition is good
19	145.686	1	1	Good	Good	Overall condition is good
20	146.09	1	1	Good	Good	Overall condition is good
21	146.122	1	1	Good	Good	Overall condition is good
22	146.384	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
23	146.583	1	1	Good	Good	Overall condition is good
24	147.268	1	1	Good	Good	Overall condition is good

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway

S.No	Chainage	Span Arrangement	Dia. Of Pipe	Condition of Protection Work	Condition of Structure	Remark
25	148.837	1	1	Good	Good	Improvement of stone pitching
26	149.44	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
27	149.94	1	1	Good	Good	Improvement of stone pitching
28	150.238	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
29	152.293	1	1	Good	Good	Overall condition is good
30	152.505	1	1	Good	Good	Improvement of stone pitching
31	152.76	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
32	152.93	1	1	Good	Good	Improvement of stone pitching
33	153.2	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
34	153.4	1	1	Good	Good	Overall condition is good
35	153.7	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
36	153.8	1	1	Good	Good	Improvement of stone pitching
37	154	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
38	155.6	1	1	Good	Good	Improvement of stone pitching
39	153.148	2	1	Good	-	Overall condition is good
40	153.4	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
41	153.66	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
42	153.825	2	1	Good	Good	Overall condition is good
43	154.125	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
44	154.3	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
45	154.675	2	1	Good	Good	Improvement of stone pitching
46	154.8	2	1	Good	Good	Improvement of stone pitching
47	154.975	2	1	Good	Good	Overall condition is good
48	155.325	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
49	155.55	2	1	Good	Good	Overall condition is good
50	160.069	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
51	161.125	1	1	Good	-	Cleaning of vegetation, half of pipe is filled with silt need to clean



PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Span Arrangement	Dia. Of Pipe	Condition of Protection Work	Condition of Structure	Remark
52	162.2	1	1	Good	-	Improvement of stone pitching
53	165.331	1	1	Good	-	Overall condition is good
54	167.8	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
55	167.825	1	1	Good	Good	Overall condition is good
56	168.055	1	1	Good	Good	Improvement of stone pitching
57	168.148	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
58	168.243	1	1	Good	-	Improvement of stone pitching
59	169.693	1	1	Good	Good	Overall condition is good
60	170.054	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
61	171.086	1	1	Good	Good	Improvement of stone pitching
62	171.124	1	1	Good	Good	Overall condition is good
63	171.88	2	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
64	172.49	1	1	Good	Good	Overall condition is good
65	176.527	1	1	Good	Good	Improvement of stone pitching
66	184.018	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
67	184.575	1	1	Good	Good	Improvement of stone pitching
68	185.114	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
69	186.961	1	1	Good	Good	Improvement of stone pitching
70	188.89	1	1	Good	Good	Cleaning of vegetation, half of pipe is filled with silt need to clean
71	190.546	1	1	Good	Good	Overall condition is good
72	194.135	1	1	Good	Good	Improvement of stone pitching
73	198.374	1	1	Good	Good	Overall condition is good
74	199.451	1	1	Good	Good	Improvement of stone pitching
75	201.597	1	1	Good	Good	Overall condition is good
76	201.597	1	1	Good	Good	Improvement of stone pitching
77	201.848	1	1	Good	Good	Overall condition is good
78	201.905	1	1	Good	Good	Improvement of stone pitching

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Chainage	Span Arrangement	Dia. Of Pipe	Condition of Protection Work	Condition of Structure	Remark
79	209.053	1	1	Good	Good	Overall condition is good
80	210.551	1	1	Good	Good	Improvement of stone pitching

## MINRO BRIDGE

S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
1	136/2	135+485	BHS	2 x 5.3	10.6	2X11.10	30.9	Box	Good	Good	Overall condition is good
2	137/1	136+180	LHS	1 x 7.5	7.5	11.3	12	Box	Good	Good	Overall condition is good
			RHS	1 x 7.5	7.5	11.3	12	Box	Good	Good	Overall condition is good
			LHS	5 x 10.5	52.5	11.3	11.8	Slab	Good	Good	
3	139/4	138+865	RHS	2 x 20.5 + 1 x 10.5	51.5	11.3	11.9	T-Beam girder	Good	Good	Cleaning of vegetation
4	140/5	139+825	LHS	6 x 7.0	42	11.3	11.9	Slab	Good	Good	
			RHS	2 x 21.0	42	11.3	12	T-Beam girder	Good	Good	Overall condition is good
			LHS	2 x 9.0	18	11.3	14.1	Slab	Good	Good	
5	145/1	144+100	RHS	1 x 18.0	18	11.3	13.6	T-Beam girder	Good	Good	Overall condition is good
6	145/6	144+845	LHS	2 x 8.5	17	11.3	12	Slab	Good	Good	
			RHS	1 x 17.0	17	11.3	12.1	T-Beam girder	Good	Good	Overall condition is good
			LHS	2 x 13.5	27	11.3	12	T-Beam girder	Good	Good	

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
			RHS	3 x 9.0	27	11.3	12	Slab	Good	Good	Overall condition is good
			LHS	1 x 9.0	9	11.3	11.9	Slab	Good	Good	
8	148/4	147+705	RHS	3 x 3.0	9	11.3	12	Slab	Good	Good	Overall condition is good
			LHS	1 X 9.0	9	11.3	12	Slab	Good	Good	
9	149/1	148+755	RHS	3 x 3.0	9	11.3	12	Slab	Good	Good	Overall condition is good
			LHS	3 x 6.0	18	11.3	12.1	Slab	Good	Good	
10	151/2	150+475	RHS	1 x 18.0	18	11.3	12.1	T-Beam girder	Good	Good	Cleaning of vegetation
			LHS	2 x 9.0	18	11.3	12	Slab	Good	Good	
11	151/3	150+765	RHS	1 x 18.0	18	11.3	12	T-Beam girder	Good	Good	Overall condition is good
			LHS	1 x 7.5	7.5	11.3	12	T-Beam girder	Good	Good	Overall condition is good
12	153/1	152+080	RHS	1 x 7.5	7.5	11.3	12	T-Beam girder	Good	Good	
			LHS	5 x 10.3	51.5	11.3	12.8	Slab	Good	Good	Overall condition is good
13	153/4	152+830	RHS	1 x 10.3 + 2 x 20.6	41.2	11.3	12.1	T-Beam girder	Good	Good	-

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
14	154/3	153+335	LHS	2 x 13.9	27.8	11.3	12.1	T-Beam girder	Good	Good	Cleaning of vegetation
			RHS	2 x 13.9	27.8	11.3	12.1	T-Beam girder	Good	Good	Cleaning of vegetation
15	158/1	157+030	LHS	1 x 8.0	8	11.3	12.9	Slab	Good	Good	Cleaning of vegetation
			RHS	1 x 8.0	8	11.3	12.6	Slab	Good	Good	Cleaning of vegetation
16	167/4	166+720	LHS	2 x 16.0	32	11.3	12.1	T-Beam girder	Good	Good	Cleaning of vegetation
			RHS	4 x 8.0	32	11.3	12.2	T-Beam girder	Good	Good	Overall condition is good
17	169/1	168+387	LHS	1 x 14.0	14	11.3	12	T-Beam girder	Good	Good	Overall condition is good
			RHS	4 x 3.5	14	11.3	12.3	Slab	Good	Good	Overall condition is good
18	170/3	169+875	LHS	1 x 11.5	11.5	11.3	12.1	T-Beam girder	Good	Good	Overall condition is good
			RHS	3 x 3.8	11.4	11.3	12.2	Slab	Good	Good	Overall condition is good
19	171/1	170+630	LHS	1 x 7.5	7.5	11.3	12.1	Slab	Good	Good	Overall condition is good
			RHS	1 x 7.5	7.5	11.3	11.9	Slab	Good	Good	Overall condition is good
20	171/3	171+024	LHS	1 x 16.5	16.5	11.3	12	T-Beam girder	Good	Good	Cleaning of

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
			RHS	1 x 16.5	16.5	11.3	12.2	T-Beam girder	Good	Good	vegetation
			LHS	3 x 9.0	27	11.3	11.7	Box	Good	Good	Overall condition is good
21	173/3	172+720	RHS	3 x 9.0	27	11.3	12.2	Box	Good	Good	Overall condition is good
			LHS	2 x 3.0	6	11.3	9.5	Slab	Good	Good	Cleaning of vegetation
22	175/1	174+602	RHS	1 x 6.0	6	11.3	11.9	Slab	Good	Good	Overall condition is good
			LHS	3 x 3.0	9	11.3	13.8	Slab	Good	Good	Overall condition is good
23	175/2	174+938	RHS	1 x 9.0	9	11.3	13.7	T-Beam girder	Good	Good	Overall condition is good
			LHS	1 x 14.5	14.5	11.3	12	T-Beam girder	Good	Good	Overall condition is good
24	178/1	177+745	RHS	2 x 7.125	14.25	11.3	12	Slab	Good	Good	Overall condition is good
			LHS	1 x 8.0	8	11.3	12	Slab	Good	Good	Overall condition is good
25	179/2	178+461	RHS	1 x 8.0	8	11.3	12.3	Slab	Good	Good	Overall condition is good
			LHS	1 x 9.5	9.5	11.3	12.2	Slab	Good	Good	Overall condition is good
26	180/2	179+827	RHS	3 x 3.0	9	11.3	12.7	Slab	Good	Good	Overall condition is good
27	182/1	181+461	LHS	1 x 9.3	8.5	11.3	11.8	Slab	Good	Good	Overall condition is good

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
			RHS	3 x 3.3	8.5	11.3	11.8	Slab	Good	Good	Cleaning of vegetation
			LHS	4 x 5.0	20	11.3	11.8	Box	Good	Good	
28	186/1	185+230	RHS	4 x 5.0	20	11.3	11.8	Box	Good	Good	
			LHS	2 x 4.5	6	11.3	11.1	Slab	Good	Good	Cleaning of vegetation
29	187/3	186+528	RHS	1 x 9.0	9	11.3	12.1	Slab	Good	Good	Overall condition is good
			LHS	2 x 5.0	10	11.3	12.5	Slab	Good	Good	
30	188/1	187+270	RHS	1 x 10.0	10	11.3	11.9	Slab	Good	Good	Cleaning of vegetation
			LHS	2 x 4.0	8	11.3	11.3	Slab	Good	Good	Overall condition is good
31	193/1	192+597	RHS	1 x 8.0	8	11.3	11.9	Slab	Good	Good	
			LHS	1 x 5.5	5.5	11.3	12	Slab	Good	Good	Overall condition is good
32	195/1	194+660	RHS	1 x 8.0	8	11.3	12	Slab	Good	Good	
			LHS	1 x 6.5	16.5	11.3	12.3	T-Beam girder	Good	Good	Overall condition is good
33	199/2	198+589	RHS	4 x 4.0	16	11.3	12.5	Slab	Good	Good	
			LHS	2 x 16.0	32	11.3	12.6	T-Beam girder	Good	Good	Overall condition is good
34	200/4	199+942	RHS	4 x 8.0	32	11.3	12.4	Slab	Good	Good	
35	205/2	204+700	LHS	1 x 7.5 + 1 x 44.0 + 1 x 8.0	37.5	10.5	12	Slab	Good	Good	Overall condition is good

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Structure No.	Chainage	Side	Span Arrangement	Total Length (m)	CarriageWay Width	Deck Width (m)	Type of Structures	Condition of Protection Work	Condition of Structure	Remark
			RHS	1 x 35	35	7.5	8.5	T-Beam girder	Good	Good	
			LHS	3 x 7.5	22.5	11.3	12.1	Box	Good	Good	Overall condition is good
36	206/2	205+815	RHS	3 x 7.5	22.5	11.3	12	Box	Good	Good	
			LHS (Main carriageway/Service road)	1 x 12.5 + 1 x 21.5 + 1 x 12.5	46.5	10.9	26.8	Slab	Good	Good	Overall condition is good
				1 x 12.5 + 1 x 21.5 + 1 x 12.5					Good	Good	
37	210/2	209+480	RHS (Main carriageway/Service road)	6 x 7.7 (Service Road)	46.5	10.9	25.2	Slab	Good	Good	Overall condition is good

## VUP/LVUP

S.No	Location (km)	Chainage	Type of Structures	Span Arrangement	Clear Height (m)	Horizontal Clearance (m)	Carriageway width (m)	Width of structure (m)
1	205/1	204+000	Frame (VUP)	1 x 34.0	5.5	34	2X11.3	27.1
2	-	207+120	Box (VUP)	1 x 12.0	5.5	12	2X11.3	27.1
3	141/5	140+580	Box (PUP)	1 x 5.5	3	5.5	2X11.3	27.1
4	148/1	147+022	Slab (PUP)	1 x 5.5	3	5.5	2X11.3	27.1
5	155/3	154+492	Slab (PUP)	1 x 5.5	3	5.5	2X11.3	27.1
6	-	209+450	Slab (PUP)	1 x 12	3.5	12	2X11.3	27.1
7	198/2	196+800	Flyover (T-Beam Girder)	1 x 27.0	5.5	27	2X10.5	27.1



8	209/2	208+513	Flyover (Girder)	1x20+1x40x1x20	5.5	80	2X10.5	27.1
---	-------	---------	------------------	----------------	-----	----	--------	------

## MAJOR BRIDGE

S. No.	Chainage	Structure No.	Side	Type of Structures	Span Arrangement	Length of Structure (m)	Deck width (m)	Width carriageway
1	162+800	162/3 Krishna	LHS	PSE T-Beamslab	1 x 34.45+1 x 33.825+24 x 34.75+1 x 38.70	940.975	1x11.50	1x10.50
			RHS		56x16	896	1x8.00	1x7.00
2	203+700	204/1 Tungabhadra	LHS	T-Beamslab	16x40	640	1x11.50	1x10.50
			RHS		32x20	640	1x8.00	1x7.00
3	210+400	211/1 Hundri	LHS	Girder	9x19.40	174.9	1x11.90	1x10.50
			RHS	Girder	9x19.40	174.9	1x8.50	1x7.00

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
1	162/3	162+800	Major Bridge	LHS	II	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					IV	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					VI	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					VIII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					X	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XIV	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XVI	1	1	1	Overall structure is in good condition.

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
									UPV reading are in excellent to good range
					XVIII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XX	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXIV	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXVI	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXVIII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
				RHS	I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
					III	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					VII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XI	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XV	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XIX	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXIV	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXVIII	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XXXVII	1	1	1	Overall structure is in good condition.

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
									UPV reading are in excellent to good range
					XL	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					XLVI	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					LIV	1	1	1	Overall structure is in good condition.
2	204/1	203+700	Major bridge	LHS					UPV reading are in excellent to good range
					I (outer)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					I (Inner)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Girder I (outer)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Girder	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
					Slab I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Slab (inner)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					II (outer)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Girder I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Abutment II (Outer)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Abutment II (Inner)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Girder II (Outer)	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Girder II (Inner)	1	1	1	Overall structure is in good condition.

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



S.No	Str. No.	Chainage	Type of Structure	Side	Pier	No. of samples			Remarks
						UPV	RHT	Carbonation	
									UPV reading are in excellent to good range
3	211/1	210+400	Major Bridge	LHS	Abutment I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Pier I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Pier II	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
				RHS	Abutment I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Pier I	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Pier II	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range
					Abutment II	1	1	1	Overall structure is in good condition.
									UPV reading are in excellent to good range

## ROB

S.No.	Chainage	SNo.	Side	Type of Structures	Span Arrangement	Length of Structure (m)	Deck width (m)	Width carriageway
1	196+023	198/1	LHS	T – Beam	1 x 12	22.5	1 x 8.00	1 x 7.00
			RHS	Girder	1 x 32	22.5	1 x 11.50	1 x 10.50

S. No.		1
Structure No.		198/1
Chainage		196+023
Type of Structures		T – Beam
Span Arrangements		1 x 12.00 1X32.00
Details of Protection Work	Type	Crash Barrier
	Condition	Good
Present Condition of the Bridge	Abutment	Good
	Piers	Good
	Slab	Good
	Bearings	Good
	Parapet	Good
Condition of various features of bridge	Carriageway surface	Good
	Drainage Spout	Good
	Return wall / Wing wall	-
	Head wall	Good
Remarks		Removal of debris from expansion joints & removal of vegetation from side slopes required



## **INSPECTION AND CONDITION OF BRIDGE**

**Project Name : Inspection and Analysis of condition and inventory data for the  
BRIDGE on NH-44 as per in the State of TELANGANA.**

1. Bridge identification Number		
1	State Code	TS
2	Highway Code	44
3	Highway Number	44
4	Chainage	-
5	Bridge Number	162/3
6	Bridge ID	NA

### **2. Bridge Classification**

1	Structural Form	Girder
2	Material of Construction	RCC
3	Type of Bridge	Major Bridge
4	Loading as per IRC	70R
5	Year of Construction	NA
6	Traffic Lane on Bridge	3 Lane LHS Side 2 Lane RHS Side
7	Bridge Structure Crossing Features	River
8	Length of Bridge	954.5 LHS 955.5 RHS
9	Width of Carriage way	10.900 m (LHS) 7.00 m (RHS)

### **3. Bridge Structural Rating Number**

1	Rating for Integral and Non-integral Deck	: 9
2	Rating for Superstructure	: 8
3	Rating for Substructure	: 8
4	Rating for Bank and Channel	: 8
5	Rating for Structural Evaluation	: 8
6	Rating for Deck Geometry	: 7
7	Rating for Vertical & Horizontal Clearance	: 3
8	Rating for Waterway Adequacy	: 7
9	Rating for Scour efficiency	: 8

## **BRIDGE INSPECTION REPORT**

<b>Project Name</b>	<b>TOT</b>
<b>Name of the Client</b>	<b>NHAI</b>
<b>Name of Consultant</b>	<b>AVANZA</b>
<b>Date of Inspection</b>	<b>26-04-18</b>
<b>Popular Name if any</b>	<b>KRISHNA RIVER</b>
<b>Name of River/NH No/ or Crossing Feature</b>	<b>NH-44</b>

#### Photographs:

#### Existing Condition of the Bridge:



**Picture-1: Cracks on Road**



**Picture-2: Weep holes present**



**Picture-3: Toe Wall Observed**



**Picture-4: Bridge**



**Picture-5: Observed Flood Level on Pier**

**Picture-5: Vegetation observed**

**PROFORMA FOR CONDITON SURVEY OF BRIDGE**

<b>1. STRUCTURE DATA</b>		
1.1	Road Width (m)	1 X 10.5(LHS) 1 X 7.0(RHS)
1.2	Overall Deck Width (m)	1 X 11.5 (LHS) 1 X 8.0 (RHS)
1.3	Approach Roadway Width Including Shoulder (m)	1 X 10.90 (LHS) 1 X 7.0(RHS)
1.4	Height of Approach Embankment	-
1.5	Average Skew	NO
1.6	Whether Navigable	NO
1.7	Horizontal Clearance	1 X 22.25 + 26 X 35.0 + 1 X 22.25LHS 78 X 12.25 RHS
1.8	Vertical Clearance	8.50M
<b>2. GENERAL</b>		
2.1	Corrosion Protection Measures	No Corrosion Protection Measures
2.2	Bank Protection & Type	Stone Pitching
2.3	Floor Protection & Type	-
2.4	Is the Bridge Located in back water (Marine) or chemical affected water body	No back water
<b>3. APPROACHES</b>		

3.1	Type of Approach	Embankment
3.2	Material of Approach	Soil
3.3	Approach Geometrics (Straight/Curvilinear etc.)	Straight
3.4	If Approaches having any Span then provide Span details	No spans in approaches
3.5	Pavement surface (Check unevenness settlement, cracking, potholes etc.)	Cracking
3.6	Side slopes (Check pitched or un-pitched, condition of pitching/ turfing, any signs of slope failure etc.)	Un-pitched and no slope failure
3.7	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion of embankment by rain cuts
3.8	Approach slab (Check, settlement, cracks, movement etc.)	No settlement, cracks, movements
3.9	Retaining walls Type	-
3.10	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	-
3.11	Silt and Debris (Check Accumulation of silt and debris on submersible approaches in cutting and embankment.)	Accumulation of silt, debris & vegetation observed
<b>4. PROTECTION WORKS</b>		
4.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not Present
4.2	Layout, cross section profile (Check damage to the layout and the general cross section are in order.)	No damage to the layout

4.3	Slope pitching, apron, and toe walls (Check for proper slope, thickness of pitching in the slope, erosion of toe wall and indicating the nature of damage if any etc.)	Pitching, apron damage & erosion of toe wall observed
4.4	Floor Protection works (Condition if impervious floor, flexible apron, curtain walls and indicate nature of damage if any etc.)	No floor protection
4.5	Scour (Check any abnormal scour noticed.)	scouring is noticed
4.6	Reserve store material	no
<b>5. WATERWAY</b>		
5.1	Check presence of obstruction in flow and its impact on flow, island formation, Vegetation growth etc.	-
5.2	Flow pattern (Check any abnormal change in Meandering inflow and erosion of banks)	No change in meandering in flow
5.3	Maximum Flood Level observed during the year and mark the same on the pier/abutment both on the U/s and D/s (Local enquiry if necessary)	-
5.4	Afflux from U/s and D/s (Check signs of abnormal Afflux from U/s and D/s watermark on piers if any)	-
5.5	Check of erosion of bank	Yes
<b>6. FOUNDATION</b>		
6.1	Type (Main bridge and approach spans if any)	Not visible
6.2	Material	Not visible
6.3	Condition of Foundation (Check Settlement, abnormal Scour, Tilting, if any etc)	Not visible

6.4	Floating bodies, boulders etc (Check damage due to impact of floating bodies, boulders etc)	Not visible	
6.5	Seepage, vehicle impact etc (For sub-ways report seepage, vehicle impact, if any damage to the foundations etc.)	Not visible	
6.6	Check cracking, disintegration, decay,erosion, Cavitation etc.,	Not visible	
7. SUBSTRUCTURE			
7.1	Abutment (A1 & A2)	A1	A2
7.1.1	Type	Wall type	Wall type
7.1.2	Material	RCC	RCC
7.1.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strain sand other damages etc)	-	-
7.1.4	Efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Weep holes present	Weep holes present
7.1.5	Maximum Depth of Abutment Foundation	-	-
7.1.6	Abutment Width	-	-
7.1.7	Abutment Thickness	-	-
7.2	Pier		
7.2.1	Type	Wall Type	
7.2.2	Material	RCC	

7.2.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strains and other damages etc)	-	
7.2.4	Maximum Depth of Pier Foundation	-	
7.2.5	Pier Width	-	
7.2.6	Pier Thickness	1.1 m	
<b>8. FOR SUBWAYS</b>			
8.1	Check condition of side retaining wall like cracking, disintegration and seepage, if any	Not applicable	
8.2	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	Not applicable	
8.3	Check damages to protective measures to pier and abutments (For viaducts, Flyover and R.O.Bs.	Not applicable	
8.4	Check damages to protective coating or paint.	Not applicable	
<b>9. BEARING &amp; PEDESTAL</b>			
S. No.	Particulars	Bearing	Pedestal
9.1	No. per Abutment	4 LHS	4 LHS
9.2	No. per Pier	8 LHS	8 LHS
9.3	Type	NA	NA
9.4	Material	NA	NA

9.5	General condition (Check rusting, cleanliness, seizing of plates silting, accumulations of dirt in case of submersible bridges)	NA	NA
9.6	Functioning (Check excessive movement, tilting, jumping off guides)	NA	NA
9.7	Check Condition of Pads (oxidation, creep, Flattening, Bulging, splitting & displacement any)	NA	NA
9.8	Check for general cleanness	NA	NA
9.9	Check any signs of distress cracking, spalling, disintegration & any excessive shifting	NA	NA
9.10	Check loss of shape	NA	NA
9.11	Check cracks if any supporting member such as pier cap, abutment, Pedestal etc.,	NA	NA
9.12	Condition of D/s stoppers (For submergible Bridges)	NA	NA
<b>10. SUPERSTRUCTURE</b>			
10.1	Total number of Spans & Arrangement	1 X 22.25 + 1 X 35.0 + 22.25LHS 78 X 12.250 RHS	
10.2	Type of Span (T-beam, slab/box-girder etc.)	PSC Girder	
10.3	Structural System (Simply supported/continuous/Continuous overhang/balance cantilever etc.)	Continuous	



10.4	Type of Material (RCC/PSC/Steel/Timber/Masonry etc)	RCC/PSC
10.5	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling disintegration or honey combing
10.6	Check cracks (Pattern, location, explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks observed
10.7	Check exposed reinforcement, if any	No reinforcement exposed
10.8	Check wear of deck surface	Wear of deck surface is in Fair condition
10.9	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling observed
10.10	Check surface stains and rust stains along with the locations	No surface stains and rust stains
10.11	Check leaching (Effects are most usually evident on the soffits of decks )	-
10.12	Check corrosion of reinforcements, sheathing and tendon if visible	-

10.13	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	-
10.14	Check damages if any due to moving vehicle	-
10.15	Check condition of articulation (Cracks,exposed reinforcement if any)	No articulation
10.16	Check excessive vibrations, if any	No vibrations on bridge observed
10.17	Check excessive deflections(sag) or loss of camber if any at same point each time	Not applicable
10.18	Check cracks, if any, around anchorage zone for prestressed concrete members	Not applicable
10.19	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	Not applicable
10.20	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	-

10.21	Check accumulation of slit and debris on surface of deck (for submersible bridges)	Not applicable
10.22	Check peeling off of protective coat or paint	No paint
10.23	Check steel members	-
10.24	Check condition of protective system	good
10.25	Check corrosion, if any	-
10.26	Check excessive vibrations, if any	Not applicable
10.27	Check alignment of members	-
10.28	Check condition for Steel Superstructure (Adequacy, looseness of rivets, bolts or worn-out welds, especially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not applicable
10.29	Check excessive loss of camber and excessive deflections and deformations, if any	Not applicable
10.3	Check buckling, kinking, warping and waviness	Not applicable
10.31	Check apparent fracture if any	Not applicable
10.32	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not applicable

10.33	Check conditions inside the closed members	Not applicable
10.34	Check masonry arches	Not applicable
10.35	Check condition of joints mortar, pointing, masonry, etc.	Not applicable
10.36	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not applicable
10.37	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not applicable
10.38	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not applicable
10.39	Check growth of vegetation	Growth of vegetation observed
10.4	Check all cast iron/wrought iron components	Not applicable
10.41	In case of steel bridges (Corrosion/painting/loose rivet joints)	Not applicable
10.42	In case of masonry bridges (Pointing/joints mortar and bulging of spandrel)	Not applicable
10.43	Vegetation (Yes/No)	Yes
<b>11. EXPANSION JOINT</b>		
11.1	Type	Strip seal
11.2	Condition i.e. Misalignment of Joints, Debris, Accumulation etc.	NA

11.3	Functioning i.e. Cracks in wearing course, existence of normal gap, excessive noise, etc.	Minor cracks on wearing course observed
11.4	Sealing material i.e. For neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.	NA
11.5	Check secureness of the joints	Not visible
11.6	Top sliding plate i.e. check corrosion, damage to welds, etc.	Not applicable
11.7	Locking of joints i.e. Check locking of joints especially for finger type expansion joints.	NA
11.8	Check for debris in joints	Debris observed in joints
11.9	Report rattling, if any	No rattling
11.10	Check drainage from expansion joint	No drainage from expansion joint
11.11	Check alignment and clearance	Proper alignment and clearance
<b>12. WEARING COAT</b>		
12.1	Material	Bituminous
12.2	Surface Condition i.e. Cracks/ potholes/Bulges, spalling, disintegration, etc.	Cracks observed in wearing course
12.3	Check Evidence of wear (Telltale rings check for thickness as against actual thickness, check data of last inspection)	NA

12.4	Compare additional thickness with design thickness with reference to kerb Height	NA
<b>13. DRAINAGE SPOUTS AND VEST HOLES</b>		
13.1	Check clogging, deterioration and damage, if any	NA
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not affected
13.3	Check adequacies thereof	Sufficient
13.4	For subways report about adequacy of drainage and pumping arrangements etc.	Not applicable
13.5	For submersible bridges, report on functioning	Not applicable
13.6	Report absence of Drainage Spouts	No drainage spouts absence
13.7	Check choking of drainage holes provided in the bottom booms	NA
<b>14. HAND RAILS &amp; PARAPETS WALLS</b>		
14.1	Check General Condition(Check expansion Gaps and Missing parts if)	expansion gaps observed
14.2	Check Damage due to collision	No damage due to collision
14.3	Check alignment (Report any abruptness in profile)	Good
<b>15. FOOT PATHS</b>		
15.1	Check general condition (Damage due to mounting of vehicles)	NA
15.2	Check missing footpath slabs	NA
15.3	Cleanliness of ducts along footpaths	NA
<b>16. UTILITIES</b>		

16.1	Check leakage of water and sewage pipes	NA
16.2	Check any damage by telephone and electric cables.	NA
16.3	Check condition of lighting facilities	No lighting facilities
16.4	Check damages due to any other utilities	No damage due to utilities
<b>17. BRIDGE NUMBER</b>		
17.1	Check condition of painting	Fair Condition
<b>18. ENVIRONMENT</b>		
18.1	Check for signs of aggressiveness	No
<b>19. AESTHETICS</b>		
19.1	Check any visual intrusion, hoardings, vegetation on structural members	no
19.2	Check Whether all actions for maintenance and recommended during last inspection have been done or not(Give Details)	NA
<b>20. RECOMMENDATION</b>		
20.1	Recommendation for testing YES or NO	NO – Bridge requires localized repairs such as repair of wearing coat , repairing of steel exposed in Piers, removal of debris from expansion joints etc.

**21. Certificate to accorded by the inspecting official.**  
**Certificate that I have personally inspected this bridge.**

## **INSPECTION AND CONDITION OF BRIDGE**

**Project Name : Inspection and Analysis of condition and inventory data for the  
BRIDGE on NH-44 as per in the State of TELANGANA.**

1. Bridge identification Number		
1	State Code	TS
2	Highway Code	44
3	Highway Number	44
4	Chainage	-
5	Bridge Number	204/1
6	Bridge ID	NA

2. Bridge Classification		
1	Structural Form	Girder
2	Material of Construction	RCC
3	Type of Bridge	Major Bridge
4	Loading as per IRC	70R
5	Year of Construction	NA
6	Traffic Lane on Bridge	3 Lane LHS Side 2 Lane RHS Side
7	Bridge Structure Crossing Features	River
8	Length of Bridge	640 m
9	Width of Carriage way	10.50 m (LHS) 7.00 m (RHS)

3. Bridge Structural Rating Number		
1	Rating for Integral and Non-integral Deck	: 9
2	Rating for Superstructure	: 8
3	Rating for Substructure	: 8
4	Rating for Bank and Channel	: 8
5	Rating for Structural Evaluation	: 8
6	Rating for Deck Geometry	: 7
7	Rating for Vertical & Horizontal Clearance	: 3
8	Rating for Waterway Adequacy	: 7
9	Rating for Scour efficiency	: 8

## **BRIDGE INSPECTION REPORT**



<b>Project Name</b>	<b>TOT</b>
<b>Name of the Client</b>	<b>NHAI</b>
<b>Name of Consultant</b>	<b>AVANZA</b>
<b>Date of Inspection</b>	<b>26-04-18</b>
<b>Popular Name if any</b>	<b>Tungabhadra</b>
<b>Name of River/NH No/ or Crossing Feature</b>	<b>NH-44</b>

#### Photographs:

#### Existing Condition of the Bridge:



**Picture-1: Cracks on Road**



**Picture-2: Weep holes Not present**



**Picture-3: Toe Wall Observed**



**Picture-4: Bridge**



**Picture-5: Observed Flood Level on Pier**

**Picture-5: Vegetation observed**

**PROFORMA FOR CONDITON SURVEY OF BRIDGE**

<b>1. STRUCTURE DATA</b>		
1.1	Road Width (m)	1 X 10.5 (LHS) 1 X 7.0 (RHS)
1.2	Overall Deck Width (m)	1 X 11.5 (LHS) 1 X 8.0 (RHS)
1.3	Approach Roadway Width Including Shoulder (m)	1 X 10.5 (LHS) 1 X 7.0 (RHS)
1.4	Height of Approach Embankment	-
1.5	Average Skew	NO
1.6	Whether Navigable	NO
1.7	Horizontal Clearance	16 X 40.0m LHS 32 X 20.0m RHS
1.8	Vertical Clearance	8.5m
<b>2. GENERAL</b>		
2.1	Corrosion Protection Measures	No Corrosion Protection Measures
2.2	Bank Protection & Type	Stone Pitching
2.3	Floor Protection & Type	-
2.4	Is the Bridge Located in back water (Marine) or chemical affected water body	No back water
<b>3. APPROACHES</b>		
3.1	Type of Approach	Embankment
3.2	Material of Approach	Soil

3.3	Approach Geometrics (Straight/Curvilinear etc.)	Straight
3.4	If Approaches having any Span then provide Span details	No spans in approaches
3.5	Pavement surface (Check unevenness settlement, cracking, potholes etc.)	Cracking
3.6	Side slopes (Check pitched or un-pitched, condition of pitching/ turfing, any signs of slope failure etc.)	Un-pitched and no slope failure
3.7	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion of embankment by rain cuts
3.8	Approach slab (Check, settlement, cracks, movement etc.)	No settlement, cracks, movements
3.9	Retaining walls Type	-
3.10	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	-
3.11	Silt and Debris (Check Accumulation of silt and debris on submersible approaches in cutting and embankment.)	Accumulation of silt, debris & vegetation observed
<b>4. PROTECTION WORKS</b>		
4.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not Present
4.2	Layout, cross section profile (Check damage to the layout and the general cross section are in order.)	No damage to the layout
4.3	Slope pitching, apron, and toe walls (Check for proper slope, thickness of pitching in the slope, erosion of toe wall and indicating the nature of damage if any etc.)	Pitching, apron damage & erosion of toe wall observed

4.4	Floor Protection works (Condition if impervious floor, flexible apron, curtain walls and indicate nature of damage if any etc.)	No floor protection
4.5	Scour (Check any abnormal scour noticed.)	scouring is noticed
4.6	Reserve store material	no
<b>5. WATERWAY</b>		
5.1	Check presence of obstruction in flow and its impact on flow, island formation, Vegetation growth etc.	-
5.2	Flow pattern (Check any abnormal change in Meandering inflow and erosion of banks)	No change in meandering in flow
5.3	Maximum Flood Level observed during the year and mark the same on the pier/abutment both on the U/s and D/s (Local enquiry if necessary)	-
5.4	Afflux from U/s and D/s (Check signs of abnormal Afflux from U/s and D/s watermark on piers if any)	-
5.5	Check of erosion of bank	Yes
<b>6. FOUNDATION</b>		
6.1	Type (Main bridge and approach spans if any)	Not visible
6.2	Material	Not visible
6.3	Condition of Foundation (Check Settlement, abnormal Scour, Tilting, if any etc)	Not visible
6.4	Floating bodies, boulders etc (Check damage due to impact of floating bodies, boulders etc)	Not visible

6.5	Seepage, vehicle impact etc (For sub-ways report seepage, vehicle impact, if any damage to the foundations etc.)	Not visible
6.6	Check cracking, disintegration, decay, erosion, Cavitation etc.,	Not visible
<b>7. SUBSTRUCTURE</b>		
7.1	<b>Abutment (A1 &amp; A2)</b>	<b>A1</b> <b>A2</b>
7.1.1	Type	Wall type      Wall type
7.1.2	Material	RCC      RCC
7.1.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strain sand other damages etc)	-      -
7.1.4	Efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Weep holes Not present      Weep Not holes present
7.1.5	Maximum Depth of Abutment Foundation	-      -
7.1.6	Abutment Width	-      -
7.1.7	Abutment Thickness	-      -
7.2	<b>Pier</b>	
7.2.1	Type	RC Pier (LHS) Wall type(RHS)
7.2.2	Material	RCC
7.2.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strains and other damages etc)	-

7.2.4	Maximum Depth of Pier Foundation	-	
7.2.5	Pier Width	-	
7.2.6	Pier Thickness	1.1 m	
<b>8. FOR SUBWAYS</b>			
8.1	Check condition of side retaining wall like cracking, disintegration and seepage, if any	Not applicable	
8.2	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	Not applicable	
8.3	Check damages to protective measures to pier and abutments (For viaducts, Flyover and R.O.Bs.	Not applicable	
8.4	Check damages to protective coating or paint.	Not applicable	
<b>9. BEARING &amp; PEDESTAL</b>			
<b>S. No.</b>	<b>Particulars</b>	<b>Bearing</b>	<b>Pedestal</b>
9.1	No. per Abutment	4 LHS	4 LHS
9.2	No. per Pier	8 LHS	8 LHS
9.3	Type	NA	NA
9.4	Material	NA	NA
9.5	General condition (Check rusting, cleanliness, seizing of plates silting, accumulations of dirt in case of submersible bridges)	NA	NA
9.6	Functioning (Check excessive movement, tilting, jumping off guides)	NA	NA

9.7	Check Condition of Pads (oxidation, creep, Flattening, Bulging, splitting & displacement any	NA	NA
9.8	Check for general cleanness	NA	NA
9.9	Check any signs of distress cracking, spalling, disintegration & any excessive shifting	NA	NA
9.10	Check loss of shape	NA	NA
9.11	Check cracks if any supporting member such as pier cap, abutment, Pedestal etc.,	NA	NA
9.12	Condition of D/s stoppers (For submergible Bridges	NA	NA
<b>10. SUPERSTRUCTURE</b>			
10.1	Total number of Spans & Arrangement	16 X 40.0 LHS 32 X 20.0 RHS	
10.2	Type of Span (T-beam, slab/box- girder etc.)	PSC Gider	
10.3	Structural System (Simply supported/continuous/Continuous overhang/balance cantilever etc.)	Continuous	
10.4	Type of Material (RCC/PSC/Steel/Timber/Masonry etc)	RCC/PSC	
10.5	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling disintegration or honey combing	

10.6	Check cracks (Pattern, location, explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks observed
10.7	Check exposed reinforcement, if any	No reinforcement exposed
10.8	Check wear of deck surface	Wear of deck surface is in Fair condition
10.9	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling observed
10.10	Check surface stains and rust stains along with the locations	No surface stains and rust stains
10.11	Check leaching (Effects are most usually evident on the soffits of decks )	-
10.12	Check corrosion of reinforcements, sheathing and tendon if visible	-
10.13	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	-
10.14	Check damages if any due to moving vehicle	-



10.15	Check condition of articulation (Cracks,exposed reinforcement if any)	No articulation
10.16	Check excessive vibrations, if any	vibrations on bridge observed
10.17	Check excessive deflections(sag) or loss of camber if any at same point each time	Not applicable
10.18	Check cracks, if any, around anchorage zone for prestressed concrete members	Not applicable
10.19	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	Not applicable
10.20	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	-
10.21	Check accumulation of slit and debris on surface of deck (for submersible bridges)	Not applicable
10.22	Check peeling off of protective coat or paint	No paint
10.23	Check steel members	-
10.24	Check condition of protective system	good

10.25	Check corrosion, if any	-
10.26	Check excessive vibrations, if any	Not applicable
10.27	Check alignment of members	-
10.28	Check condition for Steel Superstructure (Adequacy, looseness of rivets, bolts or worn-out welds, especially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not applicable
10.29	Check excessive loss of camber and excessive deflections and deformations, if any	Not applicable
10.3	Check buckling, kinking, warping and waviness	Not applicable
10.31	Check apparent fracture if any	Not applicable
10.32	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not applicable
10.33	Check conditions inside the closed members	Not applicable
10.34	Check masonry arches	Not applicable
10.35	Check condition of joints mortar, pointing, masonry, etc.	Not applicable
10.36	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not applicable

10.37	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not applicable
10.38	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not applicable
10.39	Check growth of vegetation	Growth of vegetation observed
10.4	Check all cast iron/wrought iron components	Not applicable
10.41	In case of steel bridges (Corrosion/painting/loose rivet joints)	Not applicable
10.42	In case of masonry bridges (Pointing/joints mortar and bulging of spandrel)	Not applicable
10.43	Vegetation (Yes/No)	Yes
<b>11. EXPANSION JOINT</b>		
11.1	Type	Strip seal
11.2	Condition i.e. Misalignment of Joints, Debris, Accumulation etc.	NA
11.3	Functioning i.e. Cracks in wearing course, existence of normal gap, excessive noise, etc.	Minor cracks on wearing course observed
11.4	Sealing material i.e. For neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.	NA

11.5	Check secureness of the joints	Not visible
11.6	Top sliding plate i.e. check corrosion, damage to welds, etc.	Not applicable
11.7	Locking of joints i.e. Check locking of joints especially for finger type expansion joints.	NA
11.8	Check for debris in joints	Debris observed in joints
11.9	Report rattling, if any	No rattling
11.10	Check drainage from expansion joint	No drainage from expansion joint
11.11	Check alignment and clearance	Proper alignment and clearance
<b>12. WEARING COAT</b>		
12.1	Material	Bituminous
12.2	Surface Condition i.e. Cracks/ potholes/Bulges, spalling, disintegration, etc.	Cracks observed in wearing course
12.3	Check Evidence of wear (Telltale rings check for thickness as against actual thickness, check data of last inspection)	NA
12.4	Compare additional thickness with design thickness with reference to kerb Height	NA
<b>13. DRAINAGE SPOUTS AND VEST HOLES</b>		
13.1	Check clogging, deterioration and damage, if any	NA
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not affected

13.3	Check adequacies thereof	Sufficient
13.4	For subways report about adequacy of drainage and pumping arrangements etc.	Not applicable
13.5	For submersible bridges, report on functioning	Not applicable
13.6	Report absence of Drainage Spouts	No drainage spouts absence
13.7	Check choking of drainage holes provided in the bottom booms	NA
<b>14. HAND RAILS &amp; PARAPETS WALLS</b>		
14.1	Check General Condition(Check expansion Gaps and Missing parts if)	expansion gaps observed
14.2	Check Damage due to collision	No damage due to collision
14.3	Check alignment (Report any abruptness in profile)	Good
<b>15. FOOT PATHS</b>		
15.1	Check general condition (Damage due to mounting of vehicles)	NA
15.2	Check missing footpath slabs	NA
15.3	Cleanliness of ducts along footpaths	NA
<b>16. UTILITIES</b>		
16.1	Check leakage of water and sewage pipes	NA
16.2	Check any damage by telephone and electric cables.	NA
16.3	Check condition of lighting facilities	No lighting facilities
16.4	Check damages due to any other utilities	No damage due to utilities
<b>17. BRIDGE NUMBER</b>		
17.1	Check condition of painting	Fair Condition

<b>18. ENVIRONMENT</b>		
18.1	Check for signs of aggressiveness	No
<b>19. AESTHETICS</b>		
19.1	Check any visual intrusion, hoardings, vegetation on structural members	no
19.2	Check Whether all actions for maintenance and recommended during last inspection have been done or not(Give Details)	NA
<b>20. RECOMMENDATION</b>		
20.1	Recommendation for testing YES or NO	NO – Bridge requires localized repairs such as repair of wearing coat , repairing of steel exposed in Piers, removal of debris from expansion joints etc.

**21. Certificate to accorded by the inspecting official.**  
**Certificate that I have personally inspected this bridge.**

## **INSPECTION AND CONDITION OF BRIDGE**

**Project Name : Inspection and Analysis of condition and inventory data for the  
BRIDGE on NH-44 as per in the State of TELANGANA.**

1. Bridge identification Number		
1	State Code	TS
2	Highway Code	44
3	Highway Number	44
4	Chainage	-
5	Bridge Number	211/1
6	Bridge ID	NA

2. Bridge Classification		
1	Structural Form	Girder
2	Material of Construction	RCC
3	Type of Bridge	Major Bridge
4	Loading as per IRC	70R
5	Year of Construction	NA
6	Traffic Lane on Bridge	2 Lane LHS Side 3 Lane RHS Side
7	Bridge Structure Crossing Features	River
8	Length of Bridge	148.5m
9	Width of Carriage way	7.00 m (LHS) 10.5 m (RHS)

3. Bridge Structural Rating Number		
1	Rating for Integral and Non-integral Deck	: 9
2	Rating for Superstructure	: 8
3	Rating for Substructure	: 8
4	Rating for Bank and Channel	: 8
5	Rating for Structural Evaluation	: 8
6	Rating for Deck Geometry	: 7
7	Rating for Vertical & Horizontal Clearance	: 3
8	Rating for Waterway Adequacy	: 7
9	Rating for Scour efficiency	: 8

## **BRIDGE INSPECTION REPORT**

<b>Project Name</b>	<b>TOT</b>
<b>Name of the Client</b>	<b>NHAI</b>
<b>Name of Consultant</b>	<b>AVANZA</b>
<b>Date of Inspection</b>	<b>26-04-18</b>
<b>Popular Name if any</b>	<b>-</b>
<b>Name of River/NH No/ or Crossing Feature</b>	<b>NH-44</b>

#### Photographs:

#### Existing Condition of the Bridge:



**Picture-1: Cracks on Road**



**Picture-2: Weep holes present**





**Picture-3: Toe Wall Observed**



**Picture-4: Bridge**



**Picture-5: Observed Flood Level on Pier**

**Picture-5: Vegetation observed**

**PROFORMA FOR CONDITON SURVEY OF BRIDGE**

<b>1. STRUCTURE DATA</b>		
1.1	Road Width (m)	1 X 7.0(LHS) 1 X 10.5(RHS)
1.2	Overall Deck Width (m)	1 X 8.5(LHS) 1 X 11.9 (RHS)
1.3	Approach Roadway Width Including Shoulder (m)	1 X 8.5 (LHS) 1 X 11.9(RHS)
1.4	Height of Approach Embankment	-
1.5	Average Skew	NO
1.6	Whether Navigable	NO
1.7	Horizontal Clearance	9 X 16.5m
1.8	Vertical Clearance	5.5m LHS 7.0m RHS
<b>2. GENERAL</b>		
2.1	Corrosion Protection Measures	No Corrosion Protection Measures
2.2	Bank Protection & Type	Stone Pitching
2.3	Floor Protection & Type	-
2.4	Is the Bridge Located in back water (Marine) or chemical affected water body	No back water
<b>3. APPROACHES</b>		
3.1	Type of Approach	Embankment
3.2	Material of Approach	Soil

3.3	Approach Geometrics (Straight/Curvilinear etc.)	Straight
3.4	If Approaches having any Span then provide Span details	No spans in approaches
3.5	Pavement surface (Check unevenness settlement, cracking, potholes etc.)	Cracking
3.6	Side slopes (Check pitched or un-pitched, condition of pitching/ turfing, any signs of slope failure etc.)	Un-pitched and no slope failure
3.7	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion of embankment by rain cuts
3.8	Approach slab (Check, settlement, cracks, movement etc.)	No settlement, cracks, movements
3.9	Retaining walls Type	-
3.10	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	-
3.11	Silt and Debris (Check Accumulation of silt and debris on submersible approaches in cutting and embankment.)	Accumulation of silt, debris & vegetation observed
<b>4. PROTECTION WORKS</b>		
4.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not Present
4.2	Layout, cross section profile (Check damage to the layout and the general cross section are in order.)	No damage to the layout
4.3	Slope pitching, apron, and toe walls (Check for proper slope, thickness of pitching in the slope, erosion of toe wall and indicating the nature of damage if any etc.)	Pitching, apron damage & erosion of toe wall observed

4.4	Floor Protection works (Condition if impervious floor, flexible apron, curtain walls and indicate nature of damage if any etc.)	No floor protection
4.5	Scour (Check any abnormal scour noticed.)	scouring is noticed
4.6	Reserve store material	no
<b>5. WATERWAY</b>		
5.1	Check presence of obstruction in flow and its impact on flow, island formation, Vegetation growth etc.	-
5.2	Flow pattern (Check any abnormal change in Meandering inflow and erosion of banks)	No change in meandering in flow
5.3	Maximum Flood Level observed during the year and mark the same on the pier/abutment both on the U/s and D/s (Local enquiry if necessary)	-
5.4	Afflux from U/s and D/s (Check signs of abnormal Afflux from U/s and D/s watermark on piers if any)	-
5.5	Check of erosion of bank	Yes
<b>6. FOUNDATION</b>		
6.1	Type (Main bridge and approach spans if any)	Not visible
6.2	Material	Not visible
6.3	Condition of Foundation (Check Settlement, abnormal Scour, Tilting, if any etc)	Not visible
6.4	Floating bodies, boulders etc (Check damage due to impact of floating bodies, boulders etc)	Not visible

6.5	Seepage, vehicle impact etc (For sub-ways report seepage, vehicle impact, if any damage to the foundations etc.)	Not visible
6.6	Check cracking, disintegration, decay, erosion, Cavitation etc.,	Not visible
<b>7. SUBSTRUCTURE</b>		
7.1	<b>Abutment (A1 &amp; A2)</b>	<b>A1</b> <b>A2</b>
7.1.1	Type	Wall type      Wall type
7.1.2	Material	RCC      RCC
7.1.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strain sand other damages etc)	-      -
7.1.4	Efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	No Weep holes present      No Weep holes present
7.1.5	Maximum Depth of Abutment Foundation	-      -
7.1.6	Abutment Width	-      -
7.1.7	Abutment Thickness	-      -
7.2	<b>Pier</b>	
7.2.1	Type	Wall Type
7.2.2	Material	RCC
7.2.3	Condition (Crack, Settlement, Scour, Tilting, Rusting in exposed Steel, Strains and other damages etc)	-
7.2.4	Maximum Depth of Pier Foundation	-

7.2.5	Pier Width	-	
7.2.6	Pier Thickness	1.1 m	
<b>8. FOR SUBWAYS</b>			
8.1	Check condition of side retaining wall like cracking, disintegration and seepage, if any	Not applicable	
8.2	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	Not applicable	
8.3	Check damages to protective measures to pier and abutments (For viaducts, Flyover and R.O.Bs.	Not applicable	
8.4	Check damages to protective coating or paint.	Not applicable	
<b>9. BEARING &amp; PEDESTAL</b>			
<b>S. No.</b>	<b>Particulars</b>	<b>Bearing</b>	<b>Pedestal</b>
9.1	No. per Abutment	-	-
9.2	No. per Pier	-	-
9.3	Type	NA	NA
9.4	Material	NA	NA
9.5	General condition (Check rusting, cleanliness, seizing of plates silting, accumulations of dirt in case of submersible bridges)	NA	NA
9.6	Functioning (Check excessive movement, tilting, jumping off guides)	NA	NA

9.7	Check Condition of Pads (oxidation, creep, Flattening, Bulging, splitting & displacement any	NA	NA
9.8	Check for general cleanness	NA	NA
9.9	Check any signs of distress cracking, spalling, disintegration & any excessive shifting	NA	NA
9.10	Check loss of shape	NA	NA
9.11	Check cracks if any supporting member such as pier cap, abutment, Pedestal etc.,	NA	NA
9.12	Condition of D/s stoppers (For submergible Bridges	NA	NA
<b>10. SUPERSTRUCTURE</b>			
10.1	Total number of Spans & Arrangement	9 X 16.5m	
10.2	Type of Span (T-beam, slab/box- girder etc.)	PSC Gider	
10.3	Structural System (Simply supported/continuous/Continuous overhang/balance cantilever etc.)	Continuous	
10.4	Type of Material (RCC/PSC/Steel/Timber/Masonry etc)	RCC/PSC	
10.5	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling disintegration or honey combing	

10.6	Check cracks (Pattern, location, explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks observed
10.7	Check exposed reinforcement, if any	No reinforcement exposed
10.8	Check wear of deck surface	Wear of deck surface is in Fair condition
10.9	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling observed
10.10	Check surface stains and rust stains along with the locations	No surface stains and rust stains
10.11	Check leaching (Effects are most usually evident on the soffits of decks )	-
10.12	Check corrosion of reinforcements, sheathing and tendon if visible	-
10.13	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	-
10.14	Check damages if any due to moving vehicle	-

10.15	Check condition of articulation (Cracks,exposed reinforcement if any)	No articulation
10.16	Check excessive vibrations, if any	No vibrations on bridge observed
10.17	Check excessive deflections(sag) or loss of camber if any at same point each time	Not applicable
10.18	Check cracks, if any, around anchorage zone for prestressed concrete members	Not applicable
10.19	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	Not applicable
10.20	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	-
10.21	Check accumulation of slit and debris on surface of deck (for submersible bridges)	Not applicable
10.22	Check peeling off of protective coat or paint	No paint
10.23	Check steel members	-
10.24	Check condition of protective system	good



10.25	Check corrosion, if any	-
10.26	Check excessive vibrations, if any	Not applicable
10.27	Check alignment of members	-
10.28	Check condition for Steel Superstructure (Adequacy, looseness of rivets, bolts or worn-out welds, especially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not applicable
10.29	Check excessive loss of camber and excessive deflections and deformations, if any	Not applicable
10.3	Check buckling, kinking, warping and waviness	Not applicable
10.31	Check apparent fracture if any	Not applicable
10.32	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not applicable
10.33	Check conditions inside the closed members	Not applicable
10.34	Check masonry arches	Not applicable
10.35	Check condition of joints mortar, pointing, masonry, etc.	Not applicable
10.36	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not applicable

10.37	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not applicable
10.38	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not applicable
10.39	Check growth of vegetation	Growth of vegetation observed
10.4	Check all cast iron/wrought iron components	Not applicable
10.41	In case of steel bridges (Corrosion/painting/loose rivet joints)	Not applicable
10.42	In case of masonry bridges (Pointing/joints mortar and bulging of spandrel)	Not applicable
10.43	Vegetation (Yes/No)	Yes
<b>11. EXPANSION JOINT</b>		
11.1	Type	Strip seal
11.2	Condition i.e. Misalignment of Joints, Debris, Accumulation etc.	NA
11.3	Functioning i.e. Cracks in wearing course, existence of normal gap, excessive noise, etc.	Minor cracks on wearing course observed
11.4	Sealing material i.e. For neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.	NA

11.5	Check secureness of the joints	Not visible
11.6	Top sliding plate i.e. check corrosion, damage to welds, etc.	Not applicable
11.7	Locking of joints i.e. Check locking of joints especially for finger type expansion joints.	NA
11.8	Check for debris in joints	Debris observed in joints
11.9	Report rattling, if any	No rattling
11.10	Check drainage from expansion joint	No drainage from expansion joint
11.11	Check alignment and clearance	Proper alignment and clearance
<b>12. WEARING COAT</b>		
12.1	Material	Bituminous
12.2	Surface Condition i.e. Cracks/ potholes/Bulges, spalling, disintegration, etc.	Cracks observed in wearing course
12.3	Check Evidence of wear (Telltale rings check for thickness as against actual thickness, check data of last inspection)	NA
12.4	Compare additional thickness with design thickness with reference to kerb Height	NA
<b>13. DRAINAGE SPOUTS AND VEST HOLES</b>		
13.1	Check clogging, deterioration and damage, if any	NA
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not affected

13.3	Check adequacies thereof	Sufficient
13.4	For subways report about adequacy of drainage and pumping arrangements etc.	Not applicable
13.5	For submersible bridges, report on functioning	Not applicable
13.6	Report absence of Drainage Spouts	No drainage spouts absence
13.7	Check choking of drainage holes provided in the bottom booms	NA
<b>14. HAND RAILS &amp; PARAPETS WALLS</b>		
14.1	Check General Condition(Check expansion Gaps and Missing parts if)	No expansion gaps observed
14.2	Check Damage due to collision	No damage due to collision
14.3	Check alignment (Report any abruptness in profile)	Good
<b>15. FOOT PATHS</b>		
15.1	Check general condition (Damage due to mounting of vehicles)	NA
15.2	Check missing footpath slabs	NA
15.3	Cleanliness of ducts along footpaths	NA
<b>16. UTILITIES</b>		
16.1	Check leakage of water and sewage pipes	NA
16.2	Check any damage by telephone and electric cables.	NA
16.3	Check condition of lighting facilities	No lighting facilities
16.4	Check damages due to any other utilities	No damage due to utilities
<b>17. BRIDGE NUMBER</b>		
17.1	Check condition of painting	Fair Condition

<b>18. ENVIRONMENT</b>		
18.1	Check for signs of aggressiveness	No
<b>19. AESTHETICS</b>		
19.1	Check any visual intrusion, hoardings, vegetation on structural members	no
19.2	Check Whether all actions for maintenance and recommended during last inspection have been done or not(Give Details)	NA
<b>20. RECOMMENDATION</b>		
20.1	Recommendation for testing YES or NO	NO – Bridge requires localized repairs such as repair of wearing coat , repairing of steel exposed in Piers, removal of debris from expansion joints etc.

**21. Certificate to accorded by the inspecting official.**  
**Certificate that I have personally inspected this bridge.**

## ANNEXURE 9 NDT RESULTS

## RESULTS

**Table: NON-DESTRUCTIVE TESTS BY REBOUND HAMMER**  
(As per IS 13311 (Part 2): 1992)

No.	Ch.	Location	Rebound Hammer Analysis			Carbonation
			Direction of testing	Average Rebound Index Value	Compressive Strength (MPa)	
1	(Krishna River)	SPAN-2/GIRDER/LHS	Horizontal	53	66	No
2		SPAN-4/PIER/LHS	Horizontal	51	62	No
3		SPAN-6/PIER/LHS	Horizontal	57	70	No
4		SPAN-8/PIER/LHS	Horizontal	56	70	No
5		SPAN-10/PIER/LHS	Horizontal	62	70	No
6		SPAN-12/PIER/LHS	Horizontal	60	70	No
7		SPAN-14/PIER/LHS	Horizontal	56	70	No
8		SPAN-16/PIER/LHS	Horizontal	58	70	No
9		SPAN-18/PIER/LHS	Horizontal	60	70	No
10		SPAN-20/PIER/LHS	Horizontal	52	64	No
11		SPAN-22/PIER/LHS	Horizontal	60	70	No
12		SPAN-24/PIER/LHS	Horizontal	58	70	No
13		SPAN-26/PIER/LHS	Horizontal	58	70	No
14		SPAN-28/PIER/LHS	Horizontal	56	70	No
15		SPAN-1/SLAB/RHS	Upward	51	55	No
16		SPAN-3/PIER/RHS	Horizontal	51	62	No
17		SPAN-7/PIER/RHS	Horizontal	51	62	No
18		SPAN-11/PIER/RHS	Horizontal	50	60	No
19		SPAN-15/PIER/RHS	Horizontal	52	64	No
20	(Krishna River)	SPAN-19/PIER/RHS	Horizontal	49	58	No
21		SPAN-24/PIER/RHS	Horizontal	49	58	No
22		SPAN-28/PIER/RHS	Horizontal	50	60	No
23		SPAN-33/PIER/RHS	Horizontal	48	56	No
24		SPAN-37/PIER/RHS	Horizontal	47	54	No
25		SPAN-40/PIER/RHS	Horizontal	50	60	No
26		SPAN-44/PIER/RHS	Horizontal	45	51	No
27		SPAN-46/PIER/RHS	Horizontal	50	60	No
28		SPAN-54/PIER/RHS	Horizontal	49	58	No
29	203+600	ABUTMENT-1/OUTERSIDE/LHS	Horizontal	48	56	No
30		ABUTMENT-1/INNERSIDE/LHS	Horizontal	49	58	No
31		GIRDER-1/OUTERSIDE/LHS	Horizontal	53	66	No
32		GIRDER-1/INNERSIDE/LHS	Horizontal	52	64	No
33		SLAB-1/OUTERSIDE/LHS	Upward	56	62	No
34		SLAB-1/INNERSIDE/LHS	Upward	52	57	No
35		ABUTMENT-2/OUTERSIDE/LHS	Horizontal	52	64	No
36		ABUTMENT-2/INNERSIDE/LHS	Horizontal	52	64	No
37		GIRDER-2/OUTERSIDE/LHS	Horizontal	52	64	No
38		GIRDER-2/INNERSIDE/LHS	Horizontal	54	68	No

Quality Control Test, Survey Investigation & Material Testing for  
Preparation of a Report on Physical Condition of the Kothakota  
Bypass - Kurnool Stretch

No.	Ch.	Location	Rebound Hammer Analysis			Carbonation
			Direction of testing	Average Rebound Index Value	Compressive Strength (MPa)	
39	203+600	ABUTMENT-1/OUTERSIDE/RHS	Horizontal	50	60	No
40		ABUTMENT-1/INNERSIDE/RHS	Horizontal	52	64	No
41		GIRDER-1/OUTERSIDE/RHS	Horizontal	51	62	No
42		GIRDER-1/INNERSIDE/RHS	Horizontal	52	64	No
43		ABUTMENT-2/OUTERSIDE/RHS	Horizontal	49	58	No
44		ABUTMENT-2/INNERSIDE/RHS	Horizontal	48	56	No
45		GIRDER-2/OUTERSIDE/RHS	Horizontal	51	62	No
46		GIRDER-2/INNERSIDE/RHS	Horizontal	50	60	No
47		210+100	SPAN-1/GIRDER/LHS	Horizontal	48	56
48	SPAN-3/PIER/LHS		Horizontal	55	70	No
49	SPAN-5/PIER/LHS		Horizontal	55	70	No
50	SPAN-7/PIER/LHS		Horizontal	55	70	No
51	SPAN-9/GIRDER/LHS		Horizontal	47	54	No
52	SPAN-1/GIRDER/RHS		Horizontal	52	64	No
53	SPAN-3/PIER/RHS		Horizontal	50	60	No
54	SPAN-5/PIER/RHS		Horizontal	50	60	No
55	SPAN-7/PIER/RHS		Horizontal	53	66	No
56	SPAN-9/GIRDER/RHS		Horizontal	54	68	No
57	210+800	ABUTMENT-1/LHS	Horizontal	53	66	No
58		PIER-1/LHS	Horizontal	51	62	No
59		PIER-2/LHS	Horizontal	50	60	No
60		ABUTMENT-2/LHS	Horizontal	50	60	No
61		ABUTMENT-1/RHS	Horizontal	52	64	No
62		PIER-1/RHS	Horizontal	50	60	No
63		PIER-2/RHS	Horizontal	53	66	No
64		ABUTMENT-2/RHS	Horizontal	53	66	No
Surface Condition				Dry		
Type of Aggregate				Crushed Stone Aggregate		
Type of Cement used				OPC-43		



3

**Table: NON-DESTRUCTIVE TESTS BY ULTRASONIC PULSE VELOCITY**

Sl. No.	Chainage	Locations	Mode of Test	Time (µS)	Spacing (mm)	Ultrasonic Pulse Velocity (UPV) before corrections (km/s)	Correction due to wet/dry condition	Correction due to temperature of concrete	Indirect UPV (km/s)	Corrected Value (km/s)	Remarks/ Concrete Quality Grading
1.	(Krishna)	SPAN-2/GIRDER/LHS	Indirect	84.2	400	4.75	1.00	1.00	4.75	4.99	Excellent
2.		SPAN-4/PIER/LHS		87.2	400	4.59	1.00	1.00	4.59	4.82	Excellent
3.		SPAN-6/PIER/LHS		83.6	400	4.78	1.00	1.00	4.78	5.02	Excellent
4.		SPAN-8/PIER/LHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
5.		SPAN-10/PIER/LHS		90.4	400	4.42	1.00	1.00	4.42	4.65	Excellent
6.		SPAN-12/PIER/LHS		91.6	400	4.37	1.00	1.00	4.37	4.59	Excellent
7.		SPAN-14/PIER/LHS		88.7	400	4.51	1.00	1.00	4.51	4.74	Excellent
8.		SPAN-16/PIER/LHS		99.4	400	4.02	1.00	1.00	4.02	4.23	Good
9.		SPAN-18/PIER/LHS		89.3	400	4.48	1.00	1.00	4.48	4.70	Excellent
10.		SPAN-20/PIER/LHS		92.6	400	4.32	1.00	1.00	4.32	4.54	Excellent
11.		SPAN-22/PIER/LHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
12.		SPAN-24/PIER/LHS		86.4	400	4.63	1.00	1.00	4.63	4.86	Excellent
13.		SPAN-26/PIER/LHS		84.3	400	4.74	1.00	1.00	4.74	4.98	Excellent
14.		SPAN-28/PIER/LHS		83.3	400	4.80	1.00	1.00	4.80	5.04	Excellent
15.		SPAN-1/SLAB/RHS		142.6	600	4.21	1.00	1.00	4.21	4.42	Good
16.		SPAN-3/PIER/RHS		156.4	600	3.84	1.00	1.00	3.84	4.03	Good
17.		SPAN-7/PIER/RHS		151.2	600	3.97	1.00	1.00	3.97	4.17	Good
18.		SPAN-11/PIER/RHS		150.0	600	4.00	1.00	1.00	4.00	4.20	Good
19.		SPAN-15/PIER/RHS		149.8	600	4.01	1.00	1.00	4.01	4.21	Good
20.		SPAN-19/PIER/RHS		152.6	600	3.93	1.00	1.00	3.93	4.13	Good
21.		SPAN-24/PIER/RHS		153.4	600	3.91	1.00	1.00	3.91	4.11	Good
22.		SPAN-28/PIER/RHS		153.0	600	3.92	1.00	1.00	3.92	4.12	Good
23.		SPAN-33/PIER/RHS		155.3	600	3.86	1.00	1.00	3.86	4.06	Good
24.		SPAN-37/PIER/RHS		152.4	600	3.94	1.00	1.00	3.94	4.13	Good
25.		SPAN-40/PIER/RHS		160.2	600	3.75	1.00	1.00	3.75	3.93	Good
26.		SPAN-44/PIER/RHS		157.4	600	3.81	1.00	1.00	3.81	4.00	Good
27.		SPAN-46/PIER/RHS		164.8	600	3.64	1.00	1.00	3.64	3.82	Good
28.		SPAN-54/PIER/RHS		160.2	600	3.75	1.00	1.00	3.75	3.93	Good

Sl. No.	Chainage	Locations	Mode of Test	Time (µS)	Spacing (mm)	Ultrasonic Pulse Velocity (UPV) before corrections (km/s)	Correction due to wet/dry condition	Correction due to temperature of concrete	Indirect UPV (km/s)	Corrected Value (km/s)	Remarks/ Concrete Quality Grading
29.	203+000	ABUTMENT-1/OUTERSIDE/LHS	Indirect	104.2	400	3.84	1.00	1.00	3.84	4.03	Good
30.		ABUTMENT-1/INNERSIDE/LHS		106.4	400	3.76	1.00	1.00	3.76	3.95	Good
31.		GIRDER-1/OUTERSIDE/LHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
32.		GIRDER-1/INNERSIDE/LHS		90.3	400	4.43	1.00	1.00	4.43	4.65	Excellent
33.		SLAB-1/OUTERSIDE/LHS		91.4	400	4.38	1.00	1.00	4.38	4.60	Excellent
34.		SLAB-1/INNERSIDE/LHS		93.6	400	4.27	1.00	1.00	4.27	4.49	Good
35.		ABUTMENT-2/OUTERSIDE/LHS		103.7	400	3.86	1.00	1.00	3.86	4.05	Good
36.		ABUTMENT-2/INNERSIDE/LHS		103.0	400	3.88	1.00	1.00	3.88	4.08	Good
37.		GIRDER-2/OUTERSIDE/LHS		96.2	400	4.16	1.00	1.00	4.16	4.37	Good
38.		GIRDER-2/INNERSIDE/LHS		96.2	400	4.16	1.00	1.00	4.16	4.37	Good
39.		ABUTMENT-1/OUTERSIDE/RHS		109.2	400	3.66	1.00	1.00	3.66	3.85	Good
40.		ABUTMENT-1/INNERSIDE/RHS		106.4	400	3.76	1.00	1.00	3.76	3.95	Good
41.		GIRDER-1/OUTERSIDE/RHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
42.		GIRDER-1/INNERSIDE/RHS		90.1	400	4.44	1.00	1.00	4.44	4.66	Excellent
43.		ABUTMENT-2/OUTERSIDE/RHS		99.2	400	4.03	1.00	1.00	4.03	4.23	Good
44.		ABUTMENT-2/INNERSIDE/RHS		95.4	400	4.19	1.00	1.00	4.19	4.40	Good
45.		GIRDER-2/OUTERSIDE/RHS		86.2	400	4.64	1.00	1.00	4.64	4.87	Excellent
46.		GIRDER-2/INNERSIDE/RHS		89.4	400	4.47	1.00	1.00	4.47	4.70	Excellent

Sl. No.	Chainage	Locations	Mode of Test	Time (μS)	Spacing (mm)	Ultrasonic Pulse Velocity (UPV) before corrections (km/s)	Correction due to wet/dry condition	Correction due to temperature of concrete	Indirect UPV (km/s)	Corrected Value (km/s)	Remarks/ Concrete Quality Grading
47.	210+100	SPAN-1/GIRDER/LHS	Indire	86.4	400	4.63	1.00	1.00	4.63	4.86	Excellent
48.		SPAN-3/PIER/LHS		104.2	400	3.84	1.00	1.00	3.84	4.03	Good
49.		SPAN-5/PIER/LHS		110.1	400	3.63	1.00	1.00	3.63	3.81	Good
50.		SPAN-7/PIER/LHS		101.0	400	3.96	1.00	1.00	3.96	4.16	Good
51.		SPAN-9/GIRDER/LHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
52.		SPAN-1/GIRDER/RHS		92.4	400	4.33	1.00	1.00	4.33	4.55	Excellent
53.		SPAN-3/PIER/RHS		101.2	400	3.95	1.00	1.00	3.95	4.15	Good
54.		SPAN-5/PIER/RHS		103.8	400	3.85	1.00	1.00	3.85	4.05	Good
55.		SPAN-7/PIER/RHS		99.2	400	4.03	1.00	1.00	4.03	4.23	Good
56.		SPAN-9/GIRDER/RHS		95.2	400	4.20	1.00	1.00	4.20	4.41	Good
57.	210+80	ABUTMENT-1/LHS	Indire	104.2	400	3.84	1.00	1.00	3.84	4.03	Good
58.		PIER-1/LHS		107.7	400	3.71	1.00	1.00	3.71	3.90	Good
59.		PIER-2/LHS		99.4	400	4.02	1.00	1.00	4.02	4.23	Good
60.		ABUTMENT-2/LHS		109.3	400	3.66	1.00	1.00	3.66	3.84	Good
61.		ABUTMENT-1/RHS		108.6	400	3.68	1.00	1.00	3.68	3.87	Good
62.		PIER-1/RHS		105.2	400	3.80	1.00	1.00	3.80	3.99	Good
63.		PIER-2/RHS		103.6	400	3.86	1.00	1.00	3.86	4.05	Good
64.		ABUTMENT-2/RHS		111.4	400	3.59	1.00	1.00	3.59	3.77	Good

*Bibek*

**Bibek Kumar Jha**  
**M.Tech.(Geotechnical Engineering)**  
**Authorized Signatory**

S. No.	Ch. (Km)	Type of Structure	Side	Span No./Pier	No samples on structure			Remarks
					UPV	RHT	Carbonation	
1	Krishna River	Major bridge	LHS	Pier II	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier IV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier VI	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier VIII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier X	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XIV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XVI	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XVIII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XX	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXIV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
			RHS	Pier XXVI	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXVIII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier III	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier VII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XI	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XIX	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXIV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXVIII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXXIII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XXXVII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XL	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition

S. No.	Ch. (Km)	Type of Structure	Side	Span No./Pier	No samples on structure			Remarks
					UPV	RHT	Carbonation	
1	Krishna River	Major bridge	RHS	Pier XLIV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier XLVI	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier LIV	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
2	203+600	Major bridge	LHS	Abutment I (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment I (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder I (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder I (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Slab I (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Slab I (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
			RHS	Girder II (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder II (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment I (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment I (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder I (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder I (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II (outer)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II (inner)	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
3	210+100	Major bridge	LHS	Girder I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier III	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier V	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier VII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition

S. No.	Ch. (Km )	Type of Structure	Side	Span No./Pier	No samples on structure			Remarks
					UPV	RHT	Carbonation	
3	210+100	Major bridge	LHS	Girder IX	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
			RHS	Girder I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier III	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier V	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier VII	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Girder IX	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
4	210+800	Major bridge	LHS	Abutment I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier II	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
			RHS	Abutment I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier I	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Abutment II	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition
				Pier II	1	1	1	UPV readings are in excellent to good range. Overall structure is in good condition

Table 3. Summary of NDT conducted on structures

## ANNEXURE 10 TRAFFIC PROJECTIONS

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



	Tolltable
ADT	19,516
Seasonal Factors	
AADT (Vehicles)	19,516
PCU Factors	
AADT (PCUs)	42,178

TRAFFIC GROWTH RATES PULLUR																		
2-wheel	Auto Rick.	C.P	3WG	Mini Bus	School Bus	Govt Bus	Private Bus	Mini LCV	LCV	2 Axle Truck	3 Axle Truck	MAV	+ 6 Axles	Tractor	Tractor + Trailer	Cycle	Cycle Rick.	Total
2019	5.0%	5.0%	6.2%	7.3%	3.7%	3.7%	3.7%	3.7%	7.3%	7.3%	-0.5%	0.9%	6.9%	6.9%	3.0%	3.0%	2.0%	1.0%
2020	5.0%	5.0%	6.6%	7.7%	3.9%	3.9%	3.9%	3.9%	7.7%	7.7%	-0.5%	0.9%	7.4%	7.4%	3.0%	3.0%	2.0%	1.0%
2021	5.0%	5.0%	6.7%	7.9%	4.0%	4.0%	4.0%	4.0%	7.9%	7.9%	-0.5%	-1.0%	7.5%	7.5%	3.0%	3.0%	2.0%	1.0%
2022	5.0%	5.0%	6.9%	8.0%	4.1%	4.1%	4.1%	4.1%	8.0%	8.0%	-0.5%	-1.0%	7.7%	7.7%	3.0%	3.0%	2.0%	1.0%
2023	4.5%	4.5%	6.4%	7.4%	3.8%	3.8%	3.8%	3.8%	7.4%	7.4%	-1.3%	-1.7%	7.1%	7.1%	3.0%	3.0%	2.0%	1.0%
2024	4.5%	4.5%	6.4%	7.5%	3.8%	3.8%	3.8%	3.8%	7.5%	7.5%	-1.3%	-1.7%	7.1%	7.1%	2.8%	2.8%	1.0%	0.0%
2025	4.5%	4.5%	6.5%	7.7%	3.9%	3.9%	3.9%	3.9%	7.7%	7.7%	-1.3%	-1.8%	7.3%	7.3%	2.8%	2.8%	1.0%	0.0%
2026	4.5%	4.5%	6.5%	7.6%	3.8%	3.8%	3.8%	3.8%	7.6%	7.6%	-1.3%	-1.7%	7.2%	7.2%	2.8%	2.8%	1.0%	0.0%
2027	4.5%	4.5%	6.4%	7.5%	3.8%	3.8%	3.8%	3.8%	7.5%	7.5%	-1.3%	-1.7%	7.1%	7.1%	2.8%	2.8%	1.0%	0.0%
2028	4.5%	4.5%	5.7%	6.7%	3.4%	3.4%	3.4%	3.4%	6.7%	6.7%	-2.0%	-2.4%	6.4%	6.4%	2.8%	2.8%	1.0%	0.0%
2029	4.0%	4.0%	5.6%	6.6%	3.3%	3.3%	3.3%	3.3%	6.6%	6.6%	-1.9%	-2.3%	6.3%	6.3%	2.6%	2.6%	0.5%	0.0%
2030	4.0%	4.0%	5.6%	6.5%	3.3%	3.3%	3.3%	3.3%	6.5%	6.5%	-1.9%	-2.3%	6.2%	6.2%	2.6%	2.6%	0.5%	0.0%
2031	4.0%	4.0%	5.5%	6.4%	3.2%	3.2%	3.2%	3.2%	6.4%	6.4%	-1.9%	-2.3%	6.1%	6.1%	2.6%	2.6%	0.5%	0.0%
2032	4.0%	4.0%	5.4%	6.3%	3.2%	3.2%	3.2%	3.2%	6.3%	6.3%	-1.9%	-2.2%	6.0%	6.0%	2.6%	2.6%	0.5%	0.0%
2033	4.0%	4.0%	4.9%	5.7%	2.9%	2.9%	2.9%	2.9%	5.7%	5.7%	-2.4%	-2.8%	5.4%	5.4%	2.6%	2.6%	0.5%	0.0%
2034	3.5%	3.5%	4.8%	5.6%	2.8%	2.8%	2.8%	2.8%	5.6%	5.6%	-2.4%	-2.7%	5.3%	5.3%	2.4%	2.4%	0.0%	0.0%
2035	3.5%	3.5%	4.7%	5.5%	2.8%	2.8%	2.8%	2.8%	5.5%	5.5%	-2.4%	-2.7%	5.3%	5.3%	2.4%	2.4%	0.0%	0.0%
2036	3.5%	3.5%	4.6%	5.4%	2.7%	2.7%	2.7%	2.7%	5.4%	5.4%	-2.3%	-2.6%	5.2%	5.2%	2.4%	2.4%	0.0%	0.0%
2037	3.5%	3.5%	4.6%	5.3%	2.7%	2.7%	2.7%	2.7%	5.3%	5.3%	-2.3%	-2.6%	5.1%	5.1%	2.4%	2.4%	0.0%	0.0%
2038	3.5%	3.5%	4.5%	5.3%	2.7%	2.7%	2.7%	2.7%	5.3%	5.3%	-2.2%	-2.6%	5.0%	5.0%	2.4%	2.4%	0.0%	0.0%
2039	3.0%	3.0%	4.0%	4.7%	2.4%	2.4%	2.4%	2.4%	4.7%	4.7%	-2.7%	-3.0%	4.5%	4.5%	2.2%	2.2%	0.0%	0.0%
2040	3.0%	3.0%	4.0%	4.6%	2.3%	2.3%	2.3%	2.3%	4.6%	4.6%	-2.7%	-2.9%	4.4%	4.4%	2.2%	2.2%	0.0%	0.0%
2041	3.0%	3.0%	3.9%	4.6%	2.3%	2.3%	2.3%	2.3%	4.6%	4.6%	-2.6%	-2.9%	4.4%	4.4%	2.2%	2.2%	0.0%	0.0%
2042	3.0%	3.0%	3.8%	4.5%	2.3%	2.3%	2.3%	2.3%	4.5%	4.5%	-2.6%	-2.8%	4.3%	4.3%	2.2%	2.2%	0.0%	0.0%
2043	3.0%	3.0%	3.8%	4.4%	2.2%	2.2%	2.2%	2.2%	4.4%	4.4%	-2.5%	-2.8%	4.2%	4.2%	2.2%	2.2%	0.0%	0.0%
2044	2.5%	2.5%	3.7%	4.3%	2.2%	2.2%	2.2%	2.2%	4.3%	4.3%	-2.5%	-2.7%	4.1%	4.1%	2.0%	2.0%	0.0%	0.0%
2045	2.5%	2.5%	3.3%	3.9%	2.0%	2.0%	2.0%	2.0%	3.9%	3.9%	-2.8%	-3.1%	3.7%	3.7%	2.0%	2.0%	0.0%	0.0%
2046	2.5%	2.5%	3.3%	3.8%	1.9%	1.9%	1.9%	1.9%	3.8%	3.8%	-2.8%	-3.0%	3.6%	3.6%	2.0%	2.0%	0.0%	0.0%
2047	2.5%	2.5%	3.2%	3.7%	1.9%	1.9%	1.9%	1.9%	3.7%	3.7%	-2.7%	-3.0%	3.6%	3.6%	2.0%	2.0%	0.0%	0.0%
2048	2.5%	2.5%	3.1%	3.7%	1.9%	1.9%	1.9%	1.9%	3.7%	3.7%	-2.7%	-2.9%	3.5%	3.5%	2.0%	2.0%	0.0%	0.0%



PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



Physical condition of NH44 (NH7) – Kothakota Bypass – Kurnool (Stretch 7). Annexure Traffic Projections

PROJECTED AADT (Vehicles) Pullur																			
Year	2-wheel	Auto Rick.	C.P	3WG	Mini Bus	School Bus	Govt Bus	Private Bus	Mini LCV	LCV	2 Axle Truck	3 Axle Truck	MAV	+ 6 Axles	Tractor	Tractor + Trailer	Cycle	Cycle Rick.	Total
2019	8,515	3,124	6,770	520	0	26	552	840	1,160	876	1,497	2,389	1,842	4	7	99	3	0	28,224
2020	8,941	3,281	7,217	560	0	27	574	872	1,249	944	1,490	2,367	1,977	4	7	102	3	0	29,615
2021	9,388	3,445	7,701	604	0	28	597	907	1,347	1,018	1,483	2,344	2,126	5	8	105	3	0	31,108
2022	9,857	3,617	8,231	653	0	29	621	944	1,456	1,100	1,475	2,322	2,289	5	8	108	3	0	32,716
2023	10,301	3,780	8,753	701	0	30	644	979	1,564	1,181	1,456	2,282	2,452	5	8	111	3	0	34,251
2024	10,764	3,950	9,313	754	0	31	668	1,016	1,681	1,270	1,437	2,242	2,627	6	8	115	3	0	35,885
2025	11,249	4,127	9,922	811	0	32	694	1,056	1,809	1,367	1,418	2,203	2,819	6	9	118	3	0	37,643
2026	11,755	4,313	10,563	873	0	33	721	1,096	1,946	1,470	1,400	2,164	3,022	7	9	121	3	0	39,495
2027	12,284	4,507	11,235	938	0	35	748	1,137	2,091	1,579	1,382	2,127	3,237	7	9	124	3	0	41,444
2028	12,836	4,710	11,878	1,000	0	36	773	1,176	2,231	1,685	1,354	2,077	3,444	7	9	128	3	0	43,349
2029	13,350	4,898	12,549	1,066	0	37	799	1,215	2,378	1,796	1,328	2,028	3,662	8	10	131	3	0	45,259
2030	13,884	5,094	13,247	1,136	0	38	825	1,255	2,533	1,913	1,303	1,982	3,889	8	10	135	4	0	47,256
2031	14,439	5,298	13,974	1,209	0	39	852	1,296	2,696	2,036	1,278	1,937	4,128	9	10	138	4	0	49,343
2032	15,017	5,510	14,730	1,285	0	41	879	1,337	2,866	2,165	1,254	1,894	4,378	9	10	142	4	0	51,522
2033	15,618	5,730	15,445	1,358	0	42	905	1,375	3,029	2,288	1,224	1,842	4,615	10	11	145	4	0	53,640
2034	16,164	5,931	16,184	1,434	0	43	930	1,414	3,199	2,416	1,195	1,792	4,862	11	11	149	4	0	55,737
2035	16,730	6,139	16,946	1,513	0	44	956	1,454	3,375	2,549	1,166	1,744	5,118	11	11	153	4	0	57,913
2036	17,315	6,354	17,733	1,595	0	46	982	1,494	3,558	2,688	1,139	1,698	5,383	12	11	156	4	0	60,168
2037	17,921	6,576	18,543	1,681	0	47	1,009	1,534	3,748	2,831	1,113	1,654	5,658	12	12	160	4	0	62,503
2038	18,549	6,806	19,378	1,769	0	48	1,036	1,575	3,946	2,980	1,088	1,612	5,943	13	12	164	4	0	64,921
2039	19,105	7,010	20,158	1,853	0	49	1,060	1,612	4,132	3,121	1,059	1,564	6,211	13	12	167	4	0	67,130
2040	19,678	7,221	20,958	1,938	0	50	1,085	1,650	4,323	3,266	1,031	1,518	6,486	14	12	171	4	0	69,405
2041	20,269	7,437	21,775	2,027	0	51	1,110	1,688	4,521	3,415	1,004	1,474	6,769	15	13	175	4	0	71,746
2042	20,877	7,660	22,611	2,118	0	53	1,135	1,726	4,723	3,568	978	1,432	7,059	15	13	179	4	0	74,151
2043	21,503	7,890	23,464	2,211	0	54	1,161	1,765	4,932	3,725	953	1,392	7,356	16	13	183	4	0	76,622
2044	22,041	8,087	24,334	2,307	0	55	1,186	1,804	5,146	3,887	930	1,354	7,661	17	14	186	4	0	79,011
2045	22,592	8,289	25,140	2,397	0	56	1,209	1,839	5,345	4,038	903	1,313	7,945	17	14	190	4	0	81,291
2046	23,156	8,497	25,959	2,488	0	57	1,233	1,874	5,549	4,191	878	1,273	8,234	18	14	194	4	0	83,619
2047	23,735	8,709	26,789	2,581	0	58	1,256	1,910	5,756	4,348	854	1,236	8,528	18	14	198	4	0	85,995
2048	24,329	8,927	27,629	2,676	0	59	1,279	1,945	5,968	4,508	831	1,200	8,827	19	15	202	4	0	88,417

Projected AADT Tollable Pullur													
Year	C.V	3WG	Mini Bus	School Bus	Govt. Bus	Private Bus	Mini LCV	LCV	2 Axle Truck	3 Axle Truck	MAV	+ 6 Axles	Total
2019	6,770	520	0	26	552	840	1,160	876	1,497	2,389	1,842	4	16,475
2020	7,217	560	0	27	574	872	1,249	944	1,490	2,367	1,977	4	17,281
2021	7,701	604	0	28	597	907	1,347	1,018	1,483	2,344	2,126	5	18,160
2022	8,231	653	0	29	621	944	1,456	1,100	1,475	2,322	2,289	5	19,123
2023	8,753	701	0	30	644	979	1,564	1,181	1,456	2,282	2,452	5	20,048
2024	9,313	754	0	31	668	1,016	1,681	1,270	1,437	2,242	2,627	6	21,045
2025	9,922	811	0	32	694	1,056	1,809	1,367	1,418	2,203	2,819	6	22,137
2026	10,563	873	0	33	721	1,096	1,946	1,470	1,400	2,164	3,022	7	23,294
2027	11,235	938	0	35	748	1,137	2,091	1,579	1,382	2,127	3,237	7	24,516
2028	11,878	1,000	0	36	773	1,176	2,231	1,685	1,354	2,077	3,444	7	25,662
2029	12,549	1,066	0	37	799	1,215	2,378	1,796	1,328	2,028	3,662	8	26,867
2030	13,247	1,136	0	38	825	1,255	2,533	1,913	1,303	1,982	3,889	8	28,130
2031	13,974	1,209	0	39	852	1,296	2,696	2,036	1,278	1,937	4,128	9	29,454
2032	14,730	1,285	0	41	879	1,337	2,866	2,165	1,254	1,894	4,378	9	30,839
2033	15,445	1,358	0	42	905	1,375	3,029	2,288	1,224	1,842	4,615	10	32,133
2034	16,184	1,434	0	43	930	1,414	3,199	2,416	1,195	1,792	4,862	11	33,479
2035	16,946	1,513	0	44	956	1,454	3,375	2,549	1,166	1,744	5,118	11	34,877
2036	17,733	1,595	0	46	982	1,494	3,558	2,688	1,139	1,698	5,383	12	36,327
2037	18,543	1,681	0	47	1,009	1,534	3,748	2,831	1,113	1,654	5,658	12	37,831
2038	19,378	1,769	0	48	1,036	1,575	3,946	2,980	1,088	1,612	5,943	13	39,387
2039	20,158	1,853	0	49	1,060	1,612	4,132	3,121	1,059	1,564	6,211	13	40,832
2040	20,958	1,938	0	50	1,085	1,650	4,323	3,266	1,031	1,518	6,486	14	42,319
2041	21,775	2,027	0	51	1,110	1,688	4,521	3,415	1,004	1,474	6,769	15	43,849



PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)

Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



2042	22,611	2,118	0	53	1,135	1,726	4,723	3,568	978	1,432	7,059	15	45,419
2043	23,464	2,211	0	54	1,161	1,765	4,932	3,725	953	1,392	7,356	16	47,030
2044	24,334	2,307	0	55	1,186	1,804	5,146	3,887	930	1,354	7,661	17	48,680
2045	25,140	2,397	0	56	1,209	1,839	5,345	4,038	903	1,313	7,945	17	50,202
2046	25,959	2,488	0	57	1,233	1,874	5,549	4,191	878	1,273	8,234	18	51,754
2047	26,789	2,581	0	58	1,256	1,910	5,756	4,348	854	1,236	8,528	18	53,335
2048	27,629	2,676	0	59	1,279	1,945	5,968	4,508	831	1,200	8,827	19	54,942

PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



Projected AADT (PCUs) Pullur																			
Year	2-wheel	Auto Rick.	C/P	3WG	Mini Bus	School Bus	Govt Bus	Private Bus	Mini LCV	LCV	2 Axle Truck	3 Axle Truck	MAV	+ 6 Axles	Tractor	Tractor + Trailer	Cycle	Cycle Rick.	Total
2019	4,257	3,124	6,770	520	0	77	1,657	2,519	1,739	1,314	4,492	7,168	8,287	18	11	446	2	0	42,400
2020	4,470	3,281	7,217	560	0	80	1,721	2,617	1,874	1,415	4,470	7,101	8,898	19	11	459	2	0	44,195
2021	4,694	3,445	7,701	604	0	83	1,790	2,721	2,021	1,527	4,448	7,033	9,567	21	11	473	2	0	46,140
2022	4,929	3,617	8,231	653	0	86	1,862	2,832	2,183	1,649	4,425	6,965	10,301	22	12	487	2	0	48,256
2023	5,150	3,780	8,753	701	0	90	1,932	2,938	2,346	1,772	4,368	6,845	11,032	24	12	502	2	0	50,247
2024	5,382	3,950	9,313	754	0	93	2,005	3,049	2,521	1,904	4,312	6,727	11,821	26	13	516	2	0	52,386
2025	5,624	4,127	9,922	811	0	96	2,083	3,167	2,714	2,050	4,255	6,608	12,685	27	13	530	2	0	54,715
2026	5,877	4,313	10,563	873	0	100	2,162	3,288	2,919	2,205	4,199	6,492	13,600	29	13	545	2	0	57,180
2027	6,142	4,507	11,235	938	0	104	2,244	3,412	3,136	2,369	4,145	6,380	14,568	31	14	560	2	0	59,787
2028	6,418	4,710	11,878	1,000	0	107	2,320	3,527	3,346	2,528	4,063	6,230	15,500	34	14	576	2	0	62,253
2029	6,675	4,898	12,549	1,066	0	111	2,397	3,645	3,567	2,695	3,984	6,085	16,478	36	14	591	2	0	64,792
2030	6,942	5,094	13,247	1,136	0	115	2,476	3,765	3,800	2,870	3,908	5,946	17,503	38	15	606	2	0	67,461
2031	7,220	5,298	13,974	1,209	0	118	2,556	3,887	4,044	3,054	3,834	5,811	18,576	40	15	622	2	0	70,260
2032	7,508	5,510	14,730	1,285	0	122	2,638	4,011	4,299	3,248	3,763	5,682	19,699	43	15	638	2	0	73,194
2033	7,809	5,730	15,445	1,358	0	126	2,714	4,126	4,544	3,432	3,671	5,525	20,768	45	16	655	2	0	75,965
2034	8,082	5,931	16,184	1,434	0	129	2,791	4,243	4,798	3,624	3,584	5,375	21,878	47	16	670	2	0	78,788
2035	8,365	6,139	16,946	1,513	0	133	2,868	4,361	5,062	3,824	3,499	5,231	23,030	50	17	686	2	0	81,727
2036	8,658	6,354	17,733	1,595	0	137	2,947	4,481	5,337	4,031	3,418	5,094	24,225	52	17	703	2	0	84,783
2037	8,961	6,576	18,543	1,681	0	140	3,027	4,602	5,622	4,247	3,340	4,961	25,462	55	17	720	2	0	87,957
2038	9,274	6,806	19,378	1,769	0	144	3,107	4,724	5,918	4,470	3,265	4,835	26,743	58	18	737	2	0	91,248
2039	9,553	7,010	20,158	1,853	0	147	3,181	4,837	6,197	4,681	3,177	4,691	27,947	60	18	753	2	0	94,267
2040	9,839	7,221	20,958	1,938	0	151	3,256	4,950	6,485	4,898	3,092	4,554	29,186	63	19	770	2	0	97,381
2041	10,134	7,437	21,775	2,027	0	154	3,331	5,064	6,781	5,122	3,012	4,422	30,458	66	19	787	2	0	100,592
2042	10,438	7,660	22,611	2,118	0	158	3,406	5,179	7,085	5,352	2,934	4,297	31,764	69	20	804	2	0	103,898
2043	10,752	7,890	23,464	2,211	0	161	3,482	5,295	7,398	5,588	2,860	4,177	33,104	72	20	822	2	0	107,297
2044	11,020	8,087	24,334	2,307	0	165	3,559	5,411	7,719	5,830	2,789	4,063	34,475	75	20	838	2	0	110,694
2045	11,296	8,289	25,140	2,397	0	168	3,628	5,517	8,018	6,056	2,709	3,938	35,752	77	21	855	2	0	113,865
2046	11,578	8,497	25,959	2,488	0	171	3,698	5,623	8,323	6,287	2,634	3,820	37,053	80	21	872	2	0	117,107
2047	11,868	8,709	26,789	2,581	0	175	3,768	5,729	8,635	6,522	2,562	3,707	38,377	83	22	890	2	0	120,417
2048	12,164	8,927	27,629	2,676	0	178	3,838	5,836	8,952	6,762	2,493	3,599	39,724	86	22	907	2	0	123,793

Projected AADT Tollable (PCUs) Pullur													
Year	C/V	3WG	Mini Bus	School Bus	Govt. Bus	Private Bus	Mini LCV	LCV	2 Axle Truck	3 Axle Truck	MAV	MAV (+6 Axles)	Total
2019	6,770	520	0	77	1,657	2,519	1,739	1,314	4,492	7,168	8,287	18	34,560
2020	7,217	560	0	80	1,721	2,617	1,874	1,415	4,470	7,101	8,898	19	35,973
2021	7,701	604	0	83	1,790	2,721	2,021	1,527	4,448	7,033	9,567	21	37,516
2022	8,231	653	0	86	1,862	2,832	2,183	1,649	4,425	6,965	10,301	22	39,210
2023	8,753	701	0	90	1,932	2,938	2,346	1,772	4,368	6,845	11,032	24	40,802
2024	9,313	754	0	93	2,005	3,049	2,521	1,904	4,312	6,727	11,821	26	42,524
2025	9,922	811	0	96	2,083	3,167	2,714	2,050	4,255	6,608	12,685	27	44,418
2026	10,563	873	0	100	2,162	3,288	2,919	2,205	4,199	6,492	13,600	29	46,430
2027	11,235	938	0	104	2,244	3,412	3,136	2,369	4,145	6,380	14,568	31	48,563
2028	11,878	1,000	0	107	2,320	3,527	3,346	2,528	4,063	6,230	15,500	34	50,533
2029	12,549	1,066	0	111	2,397	3,645	3,567	2,695	3,984	6,085	16,478	36	52,612
2030	13,247	1,136	0	115	2,476	3,765	3,800	2,870	3,908	5,946	17,503	38	54,802
2031	13,974	1,209	0	118	2,556	3,887	4,044	3,054	3,834	5,811	18,576	40	57,104
2032	14,730	1,285	0	122	2,638	4,011	4,299	3,248	3,763	5,682	19,699	43	59,520
2033	15,445	1,358	0	126	2,714	4,126	4,544	3,432	3,671	5,525	20,768	45	61,754
2034	16,184	1,434	0	129	2,791	4,243	4,798	3,624	3,584	5,375	21,878	47	64,087
2035	16,946	1,513	0	133	2,868	4,361	5,062	3,824	3,499	5,231	23,030	50	66,519
2036	17,733	1,595	0	137	2,947	4,481	5,337	4,031	3,418	5,094	24,225	52	69,050
2037	18,543	1,681	0	140	3,027	4,602	5,622	4,247	3,340	4,961	25,462	55	71,681
2038	19,378	1,769	0	144	3,107	4,724	5,918	4,470	3,265	4,835	26,743	58	74,411
2039	20,158	1,853	0	147	3,181	4,837	6,197	4,681	3,177	4,691	27,947	60	76,930
2040	20,958	1,938	0	151	3,256	4,950	6,485	4,898	3,092	4,554	29,186	63	79,531
2041	21,775	2,027	0	154	3,331	5,064	6,781	5,122	3,012	4,422	30,458	66	82,213
2042	22,611	2,118	0	158	3,406	5,179	7,085	5,352	2,934	4,297	31,764	69	84,974
2043	23,464	2,211	0	161	3,482	5,295	7,398	5,588	2,860	4,177	33,104	72	87,812
2044	24,334	2,307	0	165	3,559	5,411	7,719	5,830	2,789	4,063	34,475	75	90,726
2045	25,140	2,397	0	168	3,628	5,517	8,018	6,056	2,709	3,938	35,752	77	93,402
2046	25,959	2,488	0	171	3,698	5,623	8,323	6,287	2,634	3,820	37,053	80	96,137



PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE  
NATIONAL HIGHWAYS ON ROADS UNDER (The National  
Highways Infra Trust)  
Technical Due Diligence Report of NH44 (NH7) –Stretch of  
Kothakota Bypass – Kurnool Highway



2047	26,789	2,581	0	175	3,768	5,729	8,635	6,522	2,562	3,707	38,377	83	98,927
2048	27,629	2,676	0	178	3,838	5,836	8,952	6,762	2,493	3,599	39,724	86	101,771

## ANNEXURE 11 MAJOR AND MINOR JUNCTIONS

S.No	Chainage (Km)	Side	Type
1	153+160	LHS	Y
2	156+040	LHS	Y
3	165+780	-	X
4	197+450	-	X
5	202+830	LHS	Y
6	204+250	-	X
7	208+400	-	X

Table 1. Summary of Major Junctions

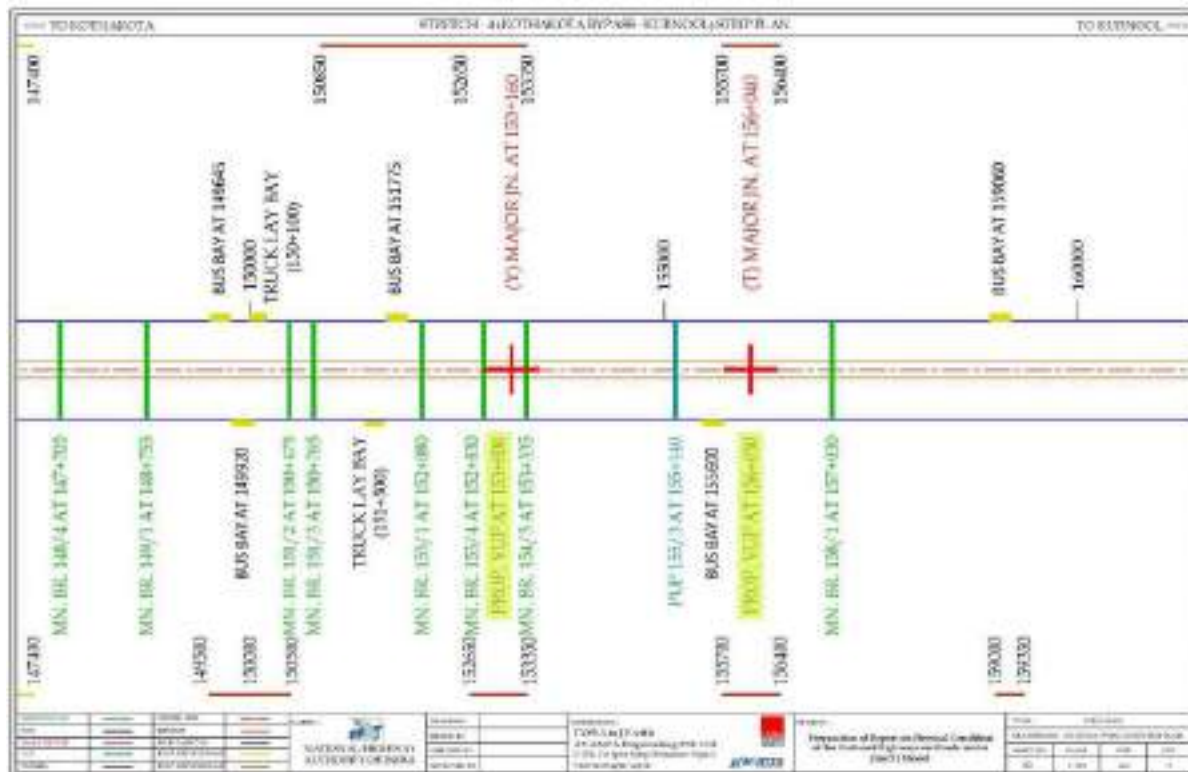
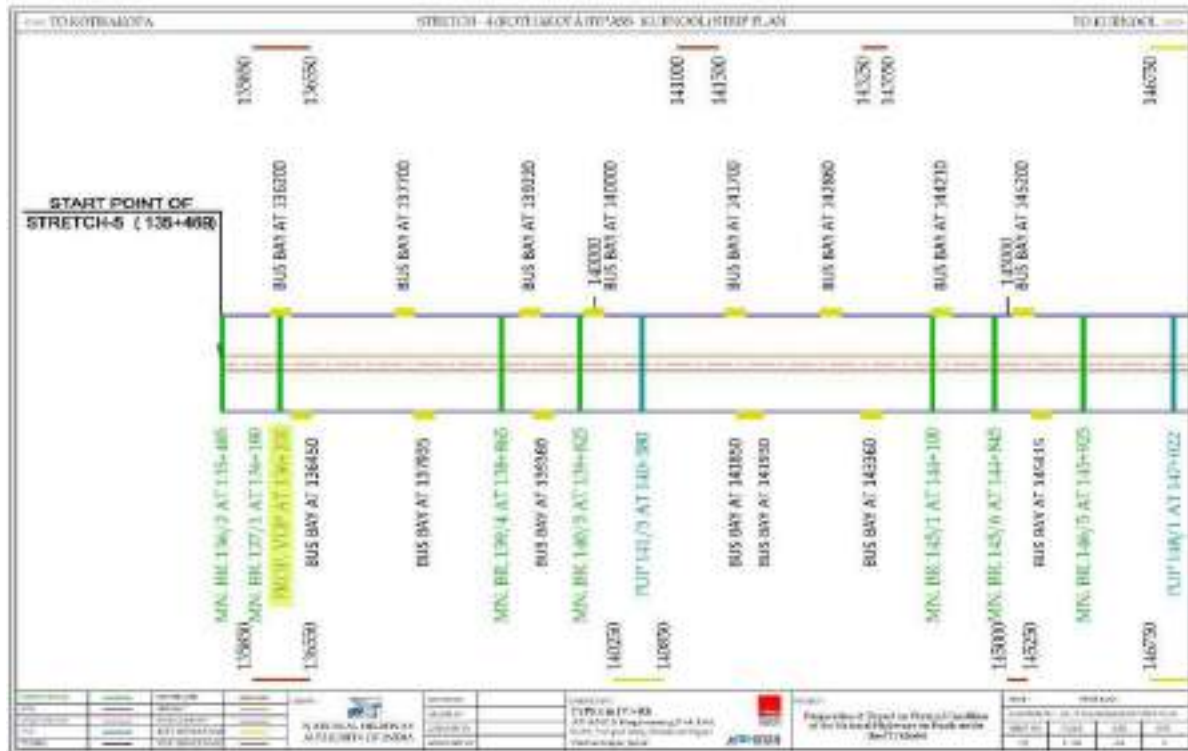
S.No	Chainage (Km)	Side	Type
1	136+250	RHS	Y
2	137+810	LHS	Y
3	137+800	RHS	T
4	139+250	LHS	Y
5	140+200	RHS	Y
6	139+300	LHS	Y
7	141+830	LHS	T
8	143+060	LHS	Y
9	143+090	RHS	Y
10	144+240	LHS	T
11	145+300	RHS	T
12	149+650	RHS	Y
13	149+800	RHS	Y
14	152+270	LHS	Y
15	157+580	LHS	Y
16	157+600	RHS	Y
17	158+750	BHS	X
18	158+900	RHS	Y
19	159+190	LHS	T
20	159+200	RHS	T
21	159+350	RHS	Y
22	161+050	RHS	Y
23	163+080	RHS	Y
24	163+150	LHS	Y
25	163+200	RHS	Y
26	163+550	RHS	T
27	163+550	LHS	Y
28	164+300	LHS	T
29	164+730	LHS	T
30	165+000	LHS	T

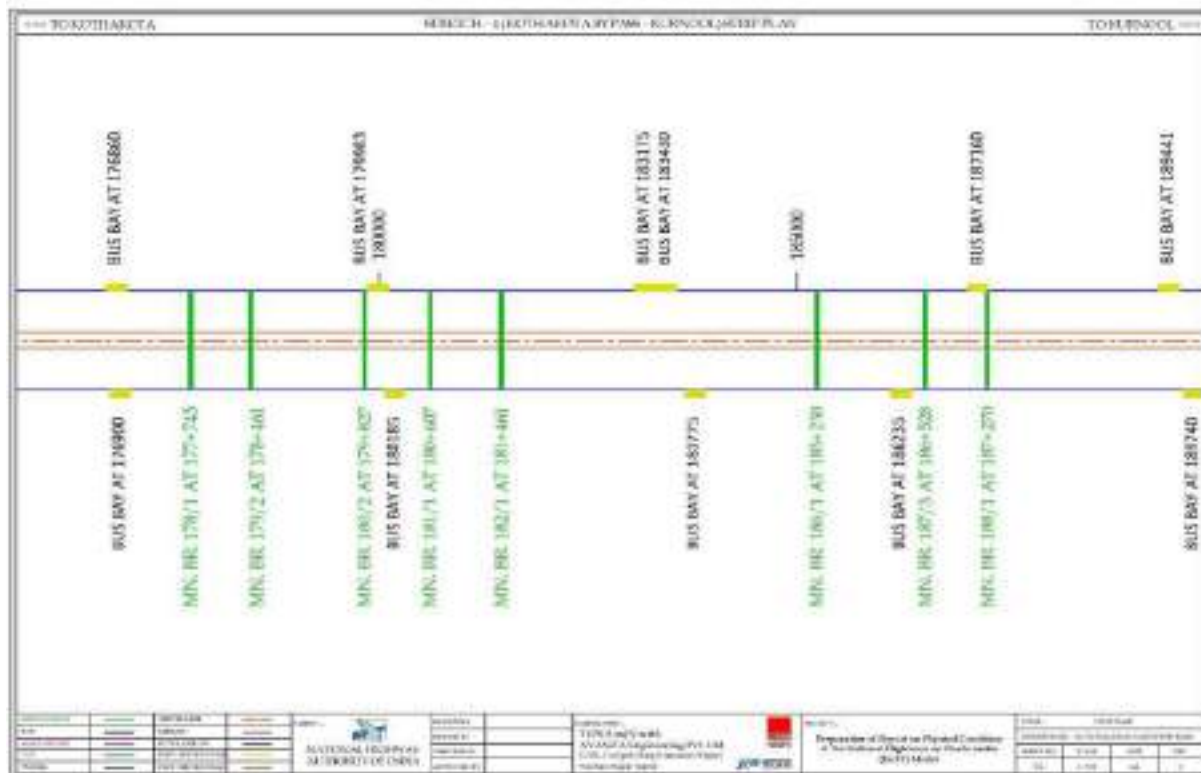
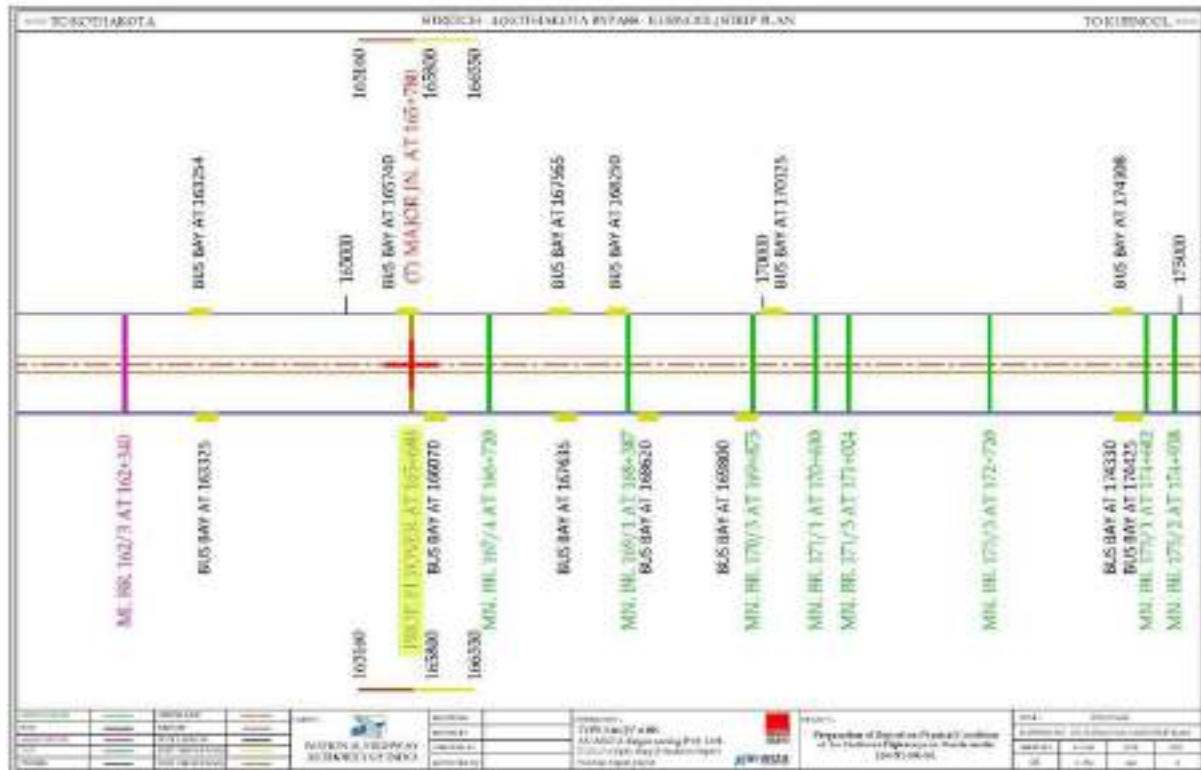
S.No	Chainage (Km)	Side	Type
31	165+400	LHS	T
32	165+580	LHS	Y
33	166+450	LHS	Y
34	166+475	LHS	Y
35	168+500	RHS	Y
36	169+700	RHS	T
37	170+250	RHS	T
38	172+950	LHS	T
39	173+950	LHS	Y
40	174+350	LHS	Y
41	174+350	RHS	Y
42	175+040	LHS	Y
43	175+050	RHS	T
44	175+240	RHS	T
45	176+950	RHS	T
46	177+890	LHS	Y
47	178+600	RHS	T
48	180+050	RHS	Y
49	180+050	LHS	Y
50	181+700	LHS	Y
51	181+700	RHS	Y
52	182+200	RHS	T
53	182+200	LHS	Y
54	183+560	LHS	Y
55	186+130	BHS	X
56	187+230	LHS	Y
57	189+550	LHS	Y
58	193+180	LHS	T
59	194+610	LHS	T
60	194+610	RHS	T
61	202+600	RHS	Y
62	202+600	LHS	Y
63	206+508	LHS	T

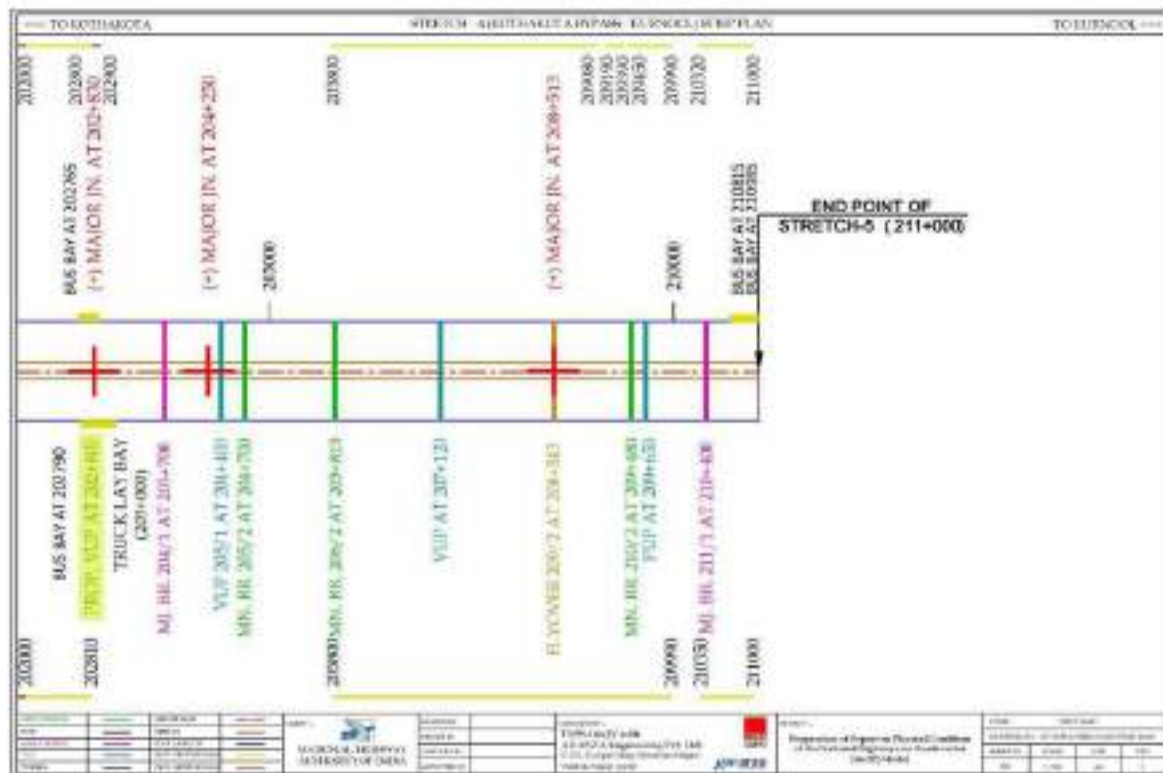
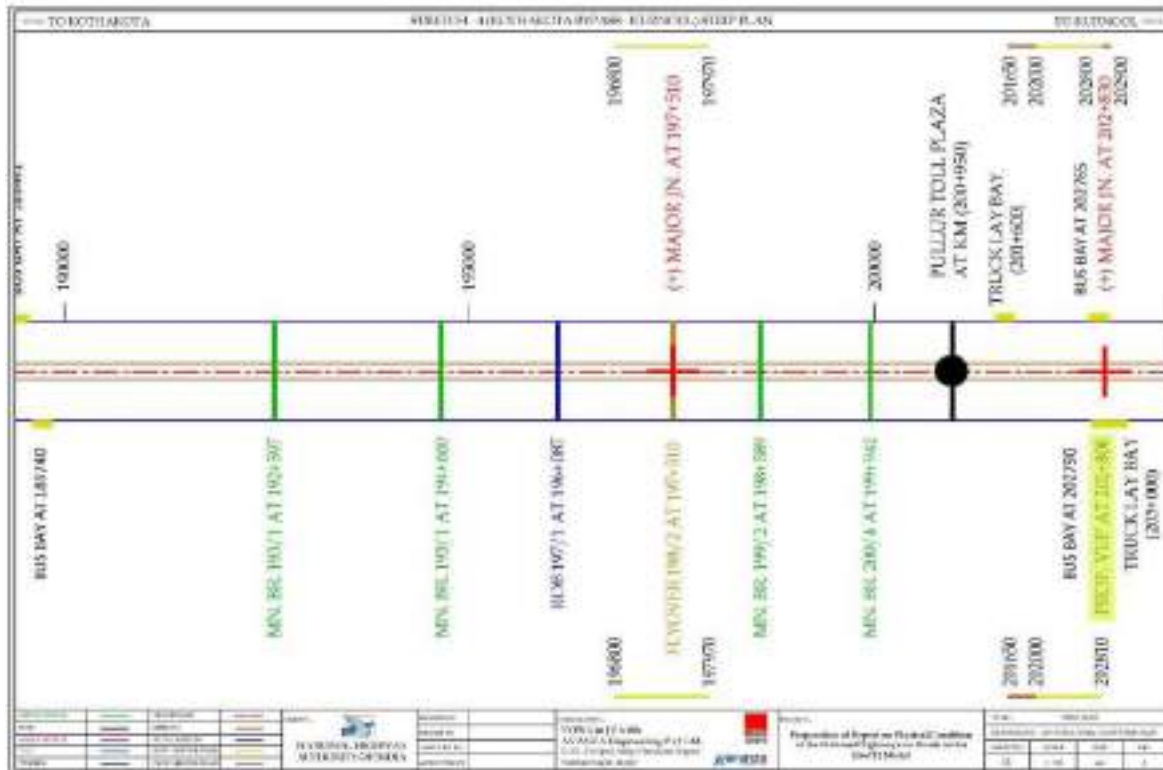
Table 2. Summary of Minor Junctions

## ANNEXURE 12 STRIP PLAN & KILOMETRIC REFERENCE










**Kilometric Reference**

**NH 44 Kothakota Bypass - Kurnool**

SR.NO.	EXISTING KM STONE	DESIGN KM CHAINAGE
1	135+000	#N/A
2	137+000	137+000
3	138+000	138+000
4	139+000	138+990
5	140+000	139+990
6	141+000	140+980
7	142+000	141+980
8	143+000	142+980
9	144+000	143+970
10	145+000	144+970
11	146+000	145+960
12	147+000	146+970
13	148+000	147+950
14	149+000	148+950
15	150+000	149+940
16	151+000	150+940
17	152+000	151+930
18	153+000	152+920
19	154+000	153+930
20	157+000	156+920
21	158+000	157+910
22	159+000	158+910
23	160+000	159+910
24	161+000	160+900
25	164+000	163+900
26	165+000	164+890
27	166+000	165+890
28	167+000	166+880
29	168+000	167+880
30	169+000	168+870
31	170+000	169+860
32	171+000	170+900
33	172+000	171+850
34	173+000	172+850
35	174+000	173+840
36	175+000	174+840
37	176+000	175+830
38	177+000	176+830
39	178+000	177+820
40	179+000	178+820
41	180+000	179+810
42	181+000	180+810
43	182+000	181+810
44	183+000	182+800

45	184+000	183+800
46	185+000	184+790
47	186+000	185+780
48	187+000	186+780
49	189+000	188+770
50	190+000	189+770
51	192+000	191+750
52	193+000	192+740
53	194+000	193+740
54	195+000	194+740
55	196+000	195+750
56	199+000	198+730
57	200+000	199+720
58	201+000	200+720
59	202+000	201+710
60	203+000	202+700
61	204+000	203+750
62	205+000	204+700
63	206+000	205+690
64	207+000	206+690
65	208+000	207+590
66	210+000	209+670





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	145/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 144.080 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Cracks are observed
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Fair condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Cracks	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Cracks are observed	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness		Clean
9.3	Concrete bearings		No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)		No concrete bearing
9.3.2	Check any excessive shifting		No concrete bearing
9.3.3	Check loss of shape		No concrete bearing
9.3.4	Check general cleanliness		No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)		No cracks
9.5	Condition of d/s stoppers (for submersible bridges)		Not a submersible bridge
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members		RCC Girders widened with Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)		No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)		No cracks
10.1.3	Check exposed reinforcement, if any		Not exposed
10.1.4	Check wear of deck surface		Cracks are observed
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)		No scaling
10.1.6	Check surface stains and rust stains along with the locations		No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )		None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible		None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck		None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	viz., kerbs, etc.)	
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	deformations, if any	
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	bitumen filler., check hardening, cracking, etc.)	
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged & rusted
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.2	Check damage due to collision			None	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
2	Vegetation shall be cleaned from bridge deck		
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 144.080 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 2. 2 : Span Arrangement


	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 3. 3 : Type of Superstructure

	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders




	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 2 : No. of Girders



Pic - 5. 0 : Bearings


	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings

	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 3 : Bearings



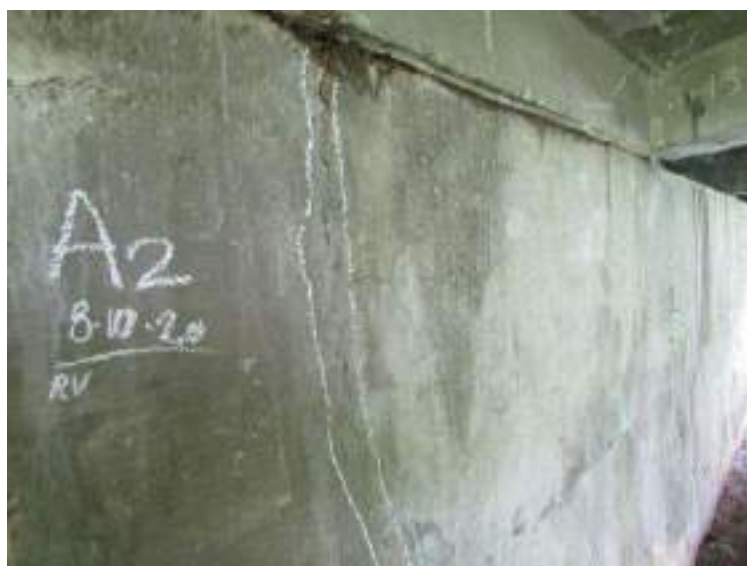
Pic - 5. 4 : Bearings



	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Substructure Damage Images



Pic - 6. 1 : Substructure Damage Images




	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images


	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Pier Stem Images



Pic - 8. 1 : Pier Stem Images

	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 2 : Pier Stem Images



Pic - 9. 0 : Return Wall Images




	<p>2349 Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 laned divided carriageway from Km. 22.300 (Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS2 BOT AP 3, AP 4 AP 5 on Hyderabad Bangalore section of NH 44 ( Old NH No. 7) in the state of Telangana Andhra Pradesh on BOT (Toll Annuity ) basis Under North South Corridor (NHDP Phase II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 1 : Return Wall Images




Pic - 9. 2 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	145/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 144.080 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Girders
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Fair condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2	Vegetation shall be cleaned from bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Debris cleaned from expansion joints		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 144.080 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 5. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 6. 0 : Substructure Damage Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 0 : Abutment Stem Images




Pic - 7. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	145/6
1.2	Name of Highway/ Location of bridge	NH 00044, Km 144.826 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	3	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2	Vegetation shall be cleaned from bridge piers				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Debris & vegetation shall be cleaned from waterway		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 144.826 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Substructure Damage Images



Pic - 7. 0 : Abutment Stem Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--



Pic - 8. 0 : Pier Stem Images




Pic - 9. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 9. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	145/6
1.2	Name of Highway/ Location of bridge	NH 00044, Km 144.826 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Covered with vegetation	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girders	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Fair condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Fair condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2	Vegetation shall be cleaned from bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Debris cleaned from expansion joints		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 144.826 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	146/5
1.2	Name of Highway/ Location of bridge	NH 00044, Km 145.895 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed, sealing material damaged

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Debris shall be cleaned from expansion joints		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Minor Bridge at Km 145.895 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Pier Stem Images



Pic - 8. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	146/5
1.2	Name of Highway/ Location of bridge	NH 00044, Km 145.895 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	3	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Spalling observed	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Cracks near support	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 145.895 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 5. 3 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 6. 1 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Pier Damage Images



Pic - 8. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 0 : Pier Stem Images




Pic - 10. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 10. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	148/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 147.960 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.			
	Date:-----	Signature of the Inspecting officer		
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 147.960 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 6. 0 : Return Wall Images



Pic - 6. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	148/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 147.960 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 147.960 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 6. 0 : Pier Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Pier Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 1 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	149/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 148.740 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 148.740 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Return Wall Images



Pic - 6. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	149/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 148.740 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from bridge				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 148.740 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Pier Stem Images



Pic - 6. 1 : Pier Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	151/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 150.478 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from bridge				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 150.478 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 1 : Abutment Stem Images



Pic - 6. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Pier Stem Images



Pic - 7. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	151/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 150.478 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Fair condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Good condition
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Fair condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Debris shall be cleaned from expansion joints		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


#### Minor Bridge at Km 150.478 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--




Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal -151/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 150.739 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	None	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No leakage	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 150.739 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Utilities


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Span Arrangement



Pic - 4. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 6. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 0 : Pier Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal -151/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 150.739 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Honey combing	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Cracks observed	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No leakage	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Debris shall be cleaned from expansion joints				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 150.739 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Utilities



Pic - 3. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Span Arrangement



Pic - 4. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Condition of Superstructure



Pic - 8. 0 : Substructure Damage Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 0 : Abutment Stem Images




Pic - 9. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 10. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal -153/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 152.054 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	No drainage spout
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	None	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	No drainage spout	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	No drainage spout	
13.3	Check adequacy thereof	Not adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be provided				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 152.054 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 0 : Abutment Stem Images




Pic - 6. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal -153/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 152.054 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	No drainage spout
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	None	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.			
	Date:-----	Signature of the Inspecting officer		
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 152.054 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 1 : Abutment Stem Images



Pic - 6. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	153/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 152.778 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged & rusted	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & rusted pipe shall be replaced				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 152.778 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 0 : No. of Girders



Pic - 5. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Pier Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 1 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	153/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 152.778 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	Good condition	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spouts shall be cleaned				
2	Debris shall be cleaned from expansion joints				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 152.778 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 1 : Pier Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 154/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 153.303 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Neoprene member damaged	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Neoprene member damaged	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Neoprene member damaged
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetations shall be removed from the bridge deck				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Expansion joints need to be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 153.303 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



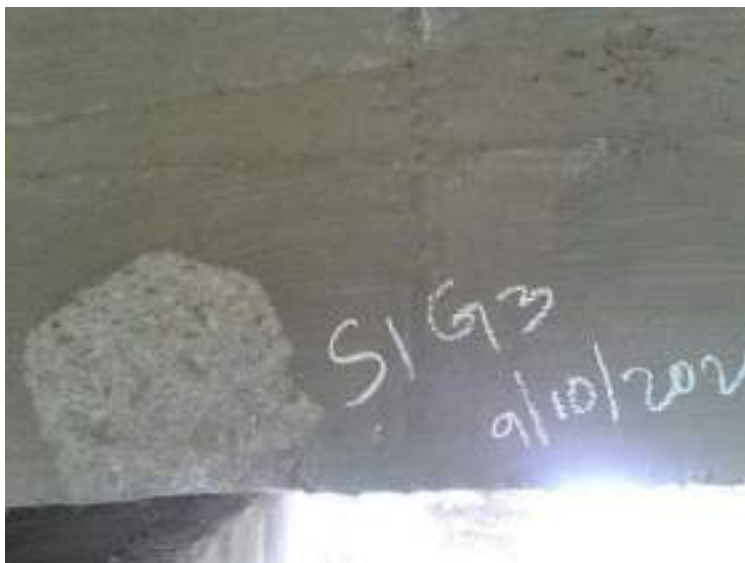
Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 6. 0 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 1 : Condition of Superstructure



Pic - 7. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 1 : Abutment Stem Images



Pic - 8. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 1 : Pier Stem Images




Pic - 9. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 154/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 153.303 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetations shall be removed from the bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Expansion joints need to be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

#### Minor Bridge at Km 153.303 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images




Pic - 7. 0 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 155/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 155.061 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Buried with BT	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 155.061 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Return Wall Images




Pic - 6. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 155/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 155.061 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, Honey combing
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Buried with BT	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Minor Bridge at Km 155.061 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Return Wall Damage Images



Pic - 6. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 1 : Abutment Stem Images



Pic - 7. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 158/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 157.010 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Buried with BT
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Minor Bridge at Km 157.010 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--




Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Return Wall Images




Pic - 6. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	MIB - 158/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 157.010 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Buried with BT
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21		Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer		
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--

Minor Bridge at Km 157.010 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 1 : Abutment Stem Images



Pic - 6. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Krishna river - 163/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 161.780 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Stone Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Partial floor protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Honey combing	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Good	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Functional	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not required	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Effective	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	PSC	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	None	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Fair condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Fair condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damage	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Expansion joints shall be cleaned				
2	Drainage spouts shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21		Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer		
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Major Bridge at Km 161.780 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 0 : Utilities



Pic - 3. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Span Arrangement



Pic - 3. 2 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Type of Superstructure



Pic - 4. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 2 : No. of Girders



Pic - 6. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Bearings



Pic - 6. 2 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 3 : Bearings



Pic - 6. 4 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Pier Stem Images



Pic - 8. 1 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 9. 0 : Return Wall Images




Pic - 9. 1 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 9. 2 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Krishna river - 163/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 161.780 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Partial floor protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Honey combing	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Poor condition	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not fully functional	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not required	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	No anchor bolts	
9.2	Elastomeric bearings (state numbers)	2	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Poor condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Not clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Balance cantilever	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Spalling near span 27	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Cracks	
10.1.3	Check exposed reinforcement, if any	Reinforcement exposed	
10.1.4	Check wear of deck surface	Good condition	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	Leaching observed	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	Not a PSC bridge	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damage	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Damaged elastomeric bearings shall be replaced				
2	Drainage spouts shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Girder spalling shall be repaired		
4	Expansion joints shall be sealed		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Major Bridge at Km 161.780 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Utilities



Pic - 3. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Span Arrangement



Pic - 4. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : Type of Superstructure



Pic - 5. 0 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : No. of Girders



Pic - 5. 2 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 2 : Bearings

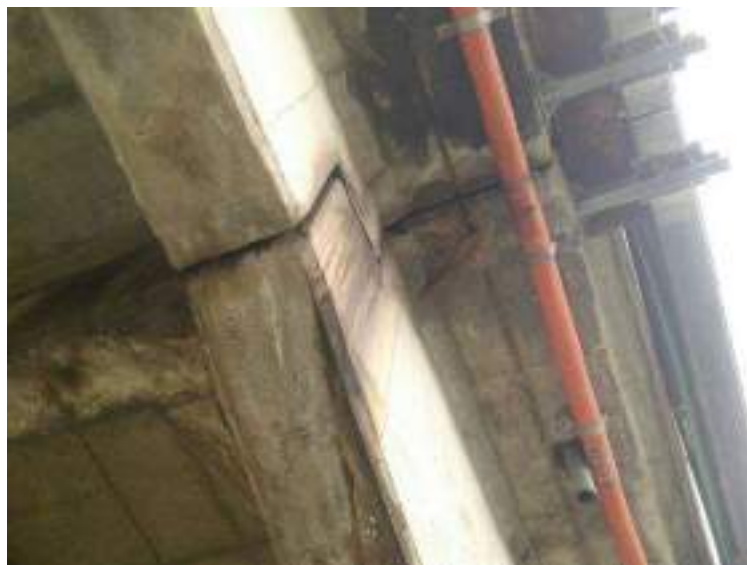


Pic - 6. 3 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Condition of Superstructure



Pic - 7. 1 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 2 : Condition of Superstructure



Pic - 7. 3 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 4 : Condition of Superstructure



Pic - 7. 5 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 6 : Condition of Superstructure



Pic - 7. 7 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Substructure Damage Images



Pic - 8. 1 : Substructure Damage Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 9. 0 : Abutment Stem Images



Pic - 9. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 10. 0 : Pier Stem Images



Pic - 10. 1 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 11. 0 : Return Wall Images




Pic - 11. 1 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 11. 2 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	167/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 166.669 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Fair condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Expansion joints shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 166.669 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 6. 0 : Abutment Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Return Wall Images




Pic - 8. 1 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	167/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 166.669 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be removed from bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 166.669 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Utilities



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 0 : Span Arrangement



Pic - 4. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 1 : Type of Superstructure



Pic - 5. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 7. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Pier Stem Images



Pic - 9. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	169/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 168.350 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Fair condition	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Expansion joints shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 168.350 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 7. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 1 : Abutment Stem Images




Pic - 8. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	169/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 168.350 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be removed from bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 168.350 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Pier Stem Images




Pic - 6. 1 : Pier Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	170/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 169.838 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Fair condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Expansion joints shall be cleaned				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 169.838 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 1 : Bearings



Pic - 6. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	170/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 169.838 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21		Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer		
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 169.838 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Pier Stem Images



Pic - 6. 1 : Pier Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal / 171/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 170.594 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No spalling	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	None	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 170.594 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--




Pic - 4. 0 : Bearings



Pic - 4. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal / 171/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 170.594 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	None
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness		No elastomeric bearing
9.3	Concrete bearings		No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)		No concrete bearing
9.3.2	Check any excessive shifting		No concrete bearing
9.3.3	Check loss of shape		No concrete bearing
9.3.4	Check general cleanliness		No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)		No cracks
9.5	Condition of d/s stoppers (for submersible bridges)		Not a submersible bridge
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members		RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)		No spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)		No cracks
10.1.3	Check exposed reinforcement, if any		Not exposed
10.1.4	Check wear of deck surface		Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)		No scaling
10.1.6	Check surface stains and rust stains along with the locations		No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )		None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible		None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)		None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	No drainage spout
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	None
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	No drainage spout
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	No drainage spout
13.3	Check adequacy thereof	Not adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be provided				
2	Vegetation shall be removed from the bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 170.594 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Utilities


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Span Arrangement



Pic - 4. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 1 : Type of Superstructure



Pic - 5. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images




Pic - 6. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	171/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 170.985 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Fair condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Expansion joints shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 170.985 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 5. 3 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 4 : Bearings



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 1 : Abutment Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Return Wall Images




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	171/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 170.985 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Fair condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Expansion joints shall be cleaned				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be removed from bridge deck		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 170.985 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	173/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 172.680 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No bearings	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No bearings	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No bearings	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No bearings	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Multicell Box	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Asphaltic plug, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 172.680 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Pier Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	173/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 172.680 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Minor damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No bearings	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No bearings	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No bearings	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No bearings	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Multicell Box	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Asphaltic plug, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be removed from the bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--


Minor Bridge at Km 172.680 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Utilities



Pic - 3. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Span Arrangement



Pic - 4. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 1 : Type of Superstructure



Pic - 5. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 7. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 0 : Pier Stem Images



Pic - 9. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	175/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 174.730 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Masonry, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	No protection
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	No drainage spout
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	No drainage spout
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	No drainage spout
13.3	Check adequacy thereof	Not adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be provided				
2	Bridge number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Minor Bridge at Km 174.730 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Abutment Stem Images



Pic - 6. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	175/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 174.730 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good condition	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned and projected				
2	Vegetation shall be removed from the bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 174.730 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 1 : Abutment Stem Images




Pic - 6. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 6. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	175/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 174.904 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation & debris	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Spalling of concrete in Piers	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Not painted	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Bridge number shall be painted on parapet				
2	Drainage spout shall be cleaned and projected				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be removed from the bridge deck		
4	Spalling in Pier shall be repaired		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 174.904 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Pier Stem Images



Pic - 8. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	175/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 174.904 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girders	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Debris shall be cleaned from the Abutment Cap				
2	Drainage spout shall be cleaned and projected				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be removed from the bridge		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 174.904 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 5. 3 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Condition of Superstructure



Pic - 6. 1 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 0 : Return Wall Images




Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	178/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 177.699 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Not Clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Girders
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be removed from the bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Expansion joints shall be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Minor Bridge at Km 177.699 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Utilities


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Type of Superstructure



Pic - 4. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 2 : Bearings



Pic - 7. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 1 : Abutment Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	178/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 177.699 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Damaged	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 177.699 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 3 : Type of Superstructure



Pic - 4. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Pier Stem Images




Pic - 6. 1 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	canal/ 179/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 178.416 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 178.416 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Return Wall Images




Pic - 6. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	canal/ 179/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 178.416 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Good condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Good	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU		
3				
4				
5				
6				
7				
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.			
	Date:-----		Signature of the Inspecting officer	
	Duration of Inspection:-----			
	From:_____Am/Pm			
	To:_____Am/Pm			
	Method of inspection			



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 178.416 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 0 : Abutment Stem Images




Pic - 6. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	180/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 179.771 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 179.771 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	180/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 179.771 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Poor condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 179.771 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : Bearings



Pic - 4. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 0 : Return Wall Images



Pic - 8. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	182/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 181.415 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Poor condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned from waterway		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 181.415 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 0 : Condition of Superstructure



Pic - 5. 1 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	182/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 181.415 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Poor condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge Number shall be painted again				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned from waterway		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


#### Minor Bridge at Km 181.415 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : Bearings



Pic - 5. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Pier Stem Images




Pic - 7. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	186/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 185.177 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness		No elastomeric bearing
9.3	Concrete bearings		No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)		No concrete bearing
9.3.2	Check any excessive shifting		No concrete bearing
9.3.3	Check loss of shape		No concrete bearing
9.3.4	Check general cleanliness		No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)		No cracks
9.5	Condition of d/s stoppers (for submersible bridges)		Not a submersible bridge
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members		RCC Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)		Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)		No cracks
10.1.3	Check exposed reinforcement, if any		Not exposed
10.1.4	Check wear of deck surface		Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)		No scaling
10.1.6	Check surface stains and rust stains along with the locations		No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )		None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible		None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)		None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Asphaltic plug, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2					

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 185.177 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Pier Stem Images



Pic - 6. 1 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Return Wall Images



Pic - 7. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	186/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 185.177 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge deck				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--


Minor Bridge at Km 185.177 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Condition of Superstructure



Pic - 6. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Pier Stem Images




Pic - 8. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 1 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	187/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 186.481 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	Erosion observed	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness		No elastomeric bearing
9.3	Concrete bearings		No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)		No concrete bearing
9.3.2	Check any excessive shifting		No concrete bearing
9.3.3	Check loss of shape		No concrete bearing
9.3.4	Check general cleanliness		No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)		No cracks
9.5	Condition of d/s stoppers (for submersible bridges)		Not a submersible bridge
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members		RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)		Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)		No cracks
10.1.3	Check exposed reinforcement, if any		Not exposed
10.1.4	Check wear of deck surface		Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)		No scaling
10.1.6	Check surface stains and rust stains along with the locations		No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )		None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible		None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)		None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Not painted	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from bridge deck				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Bridge number shall be painted		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 186.481 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Pier Stem Images



Pic - 7. 0 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	187/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 186.481 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Pitching damaged
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Embankment eroded
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Poor condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Damaged and soil eroded	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	Erosion observed	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any (For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Erosion of backfill behind abutment wall shall be rectified				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Damaged Quadrant pitching shall be repaired and slopes shall be protected		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 186.481 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Waterway damage images 1



Pic - 7. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 1 : Abutment Stem Images



Pic - 8. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	188/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 187.220 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition, Canal lining	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Damaged, Embankment soil eroded	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		Erosion observed
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any (For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Bridge number shall be painted		
4	Embankment erosion near A1 shall be rectified		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--

Minor Bridge at Km 187.220 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 5. 1 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Waterway damage images 1



Pic - 6. 1 : Waterway damage images 1




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 0 : Pier Stem Images




Pic - 9. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 9. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	188/1/ canal
1.2	Name of Highway/ Location of bridge	NH 00044, Km 187.220 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition, Canal lining
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Damaged, Embankment soil eroded
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness		No elastomeric bearing
9.3	Concrete bearings		No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)		No concrete bearing
9.3.2	Check any excessive shifting		No concrete bearing
9.3.3	Check loss of shape		No concrete bearing
9.3.4	Check general cleanliness		No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)		No cracks
9.5	Condition of d/s stoppers (for submersible bridges)		Not a submersible bridge
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members		RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)		Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)		No cracks
10.1.3	Check exposed reinforcement, if any		Not exposed
10.1.4	Check wear of deck surface		Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)		No scaling
10.1.6	Check surface stains and rust stains along with the locations		No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )		None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible		None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)		None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Gap between Canal lining and Cantilever return shall be filled properly to avoid erosion of backfill		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


#### Minor Bridge at Km 187.220 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Waterway damage images 1


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 0 : Return Wall Images



Pic - 8. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	193/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 192.544 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No elastomeric bearing


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Bridge number shall be painted		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 192.544 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Return Wall Images



Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	193/1 / Canal
1.2	Name of Highway/ Location of bridge	NH 00044, Km 192.544 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	Erosion of shoulder
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Shoulder erosion near abutment shall be rectified				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Bridge number shall be painted		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 192.544 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Condition of Superstructure



Pic - 6. 0 : Return Wall Damage Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 0 : Return Wall Images



Pic - 8. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	195/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 194.675 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Minor damaged
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge number shall be painted				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Minor Bridge at Km 194.675 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Return Wall Damage Images




Pic - 7. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	195/1/ canal
1.2	Name of Highway/ Location of bridge	NH 00044, Km 194.675 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Fair condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Slab	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Good	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Minor damaged	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge number shall be painted				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Vegetation shall be cleaned from the bridge		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


#### Minor Bridge at Km 194.675 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 5. 1 : Condition of Superstructure



Pic - 5. 2 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images




Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	198/2 / Alampur flyover
1.2	Name of Highway/ Location of bridge	NH 00044, Km 197.400 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Not present
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Not relevant to this structure
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Reinforced Earth, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure
5.5	Check any abnormal scour noticed.	
	a) For Abutments	Not relevant to this structure
	b) For Piers	Not relevant to this structure
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure
6.2	Check any abnormal change in flow pattern	Not relevant to this structure
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure
6.5	Check adequacy of waterway	Not relevant to this structure
6.6	Check of erosion of bank	Not relevant to this structure


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Not present
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not a metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not a metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not a metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	Not a metallic bearing


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Poor condition, excessive displacement
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	PSC
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Minor spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, debris observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	debris observed
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Not secured
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	No top plate
11.6	Check for debris in joints	None
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Not painted	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spouts clogging shall be cleaned		
2	Runner pipe & down take pipes shall be provided for drainage		
3	Leakage through expansion joints shall be rectified		
4	Debris shall be cleaned from abutment cap		
5	Damaged elastomeric bearings shall be replaced		
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Flyover at Km 197.400 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 3 : Bearings



Pic - 6. 0 : Flyover

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Abutment Stem Images




Pic - 7. 1 : Abutment Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	198/2 / Alampur flyover
1.2	Name of Highway/ Location of bridge	NH 00044, Km 197.400 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Not present
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Not relevant to this structure
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Reinforced Earth, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure
5.5	Check any abnormal scour noticed.	
	a) For Abutments	Not relevant to this structure
	b) For Piers	Not relevant to this structure
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure
6.2	Check any abnormal change in flow pattern	Not relevant to this structure
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure
6.5	Check adequacy of waterway	Not relevant to this structure
6.6	Check of erosion of bank	Not relevant to this structure


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Not present
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not a metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not a metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not a metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	Not a metallic bearing

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Poor condition, excessive displacement
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	PSC
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Minor spalling
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, debris observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	debris observed
11.3	Check secureness of the joints	Not secured
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	No locking
11.6	Check for debris in joints	None
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spouts clogging shall be cleaned		
2	Runner pipe & down take pipes shall be provided for drainage		
3	Leakage through expansion joints shall be rectified		
4	Debris shall be cleaned from abutment cap		
5	Damaged elastomeric bearings shall be replaced		
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Flyover at Km 197.400 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 5. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 7. 0 : Substructure Damage Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 0 : Flyover



Pic - 9. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 1 : Abutment Stem Images




Pic - 10. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 10. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	199/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 198.285 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Poor condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge number shall be painted				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Leakage from expansion joints shall be rectified		
4	Debris from abutment cap shall be cleaned		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--

Minor Bridge at Km 198.285 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Condition of Superstructure



Pic - 6. 1 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Damage Images



Pic - 8. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 1 : Abutment Stem Images




Pic - 9. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 9. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	199/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 198.285 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Poor condition	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Masonry poor condition	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	No sealing material

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Bridge number shall be painted				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Leakage from expansion joints shall be rectified		
4	Vegetation and debris from waterway shall be cleaned		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 198.285 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Pier Damage Images



Pic - 6. 1 : Pier Damage Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 8. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 1 : Pier Stem Images



Pic - 8. 2 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 3 : Pier Stem Images




Pic - 9. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 9. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	200/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 199.950 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation & debris	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Leakage from expansion joints shall be rectified				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Expansion joints shall be cleaned		
4	Vegetation & debris shall be cleaned from waterway & carriageway		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Minor Bridge at Km 199.950 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 2 : Bearings



Pic - 6. 0 : Condition of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 1 : Condition of Superstructure



Pic - 7. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 1 : Abutment Stem Images



Pic - 8. 0 : Pier Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 1 : Pier Stem Images




Pic - 9. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	200/4
1.2	Name of Highway/ Location of bridge	NH 00044, Km 199.950 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Quadrant pitching, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)		None
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern		No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway		Adequate
6.6	Check of erosion of bank		No erosion
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Masonry poor condition	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Tar paper bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not relevant	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not relevant	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not relevant	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not relevant	
9.2	Elastomeric bearings (state numbers)	No elastomeric bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No elastomeric bearing	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Slab
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Fair condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	Leaching observed
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	No sealing material

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from the bridge				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

#### Minor Bridge at Km 199.950 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 0 : Abutment Stem Images



Pic - 5. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Pier Stem Images




Pic - 7. 0 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Tungabadra river / 204/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 202.400 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Stone Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Good	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Functional	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not required	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Effective	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	PSC I Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing in End diaphragms	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	None	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Good
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	None

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damage	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Expansion joints shall be cleaned				
2	Drainage spouts shall be cleaned				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Major Bridge at Km 202.400 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Utilities

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Type of Superstructure



Pic - 4. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 2 : Bearings



Pic - 6. 3 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 4 : Bearings



Pic - 7. 0 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 1 : Condition of Superstructure



Pic - 8. 0 : Pier Damage Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Pier Damage Images



Pic - 9. 0 : Return Wall Damage Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 10. 0 : Abutment Stem Images



Pic - 10. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 11. 0 : Pier Stem Images




Pic - 12. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 12. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Tungabadra river / 204/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 202.400 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Fair condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Stone Pitching	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Fair condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Cracking & Reinforcement exposure	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing, Completely damaged	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not metallic bearing	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not metallic bearing	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not metallic bearing	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not metallic bearing	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging,	Completely disintegrated,	


Page 3 of 9.





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	splitting, displacements, if any)	Need immediate replacement
9.2.2	Check general cleanliness	Not clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	Major cracks in Pier & Abutment caps & spalling
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and Prestressed concrete members	PSC I Girder
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Severe spalling & Reinforcement exposure
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	Major cracks & spalling near bearings observed
10.1.3	Check exposed reinforcement, if any	Reinforcement exposure
10.1.4	Check wear of deck surface	None
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	Rust stains in cantilever slab
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	Leaching observed
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	Reinforcement exposure





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed through expansion joints
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged & rusted
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Poor condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices,	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	condition of hinges, splices, etc.)	
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap,	Strip seal, Debris are

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	excessive noise, etc.)	observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Poor condition
11.3	Check secureness of the joints	Not secured
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Not proper
11.9	Check alignment and clearance	Not proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged & rusted
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.1	Check general condition (check expansion gaps, missing parts if any etc)		Good condition		
14.2	Check damage due to collision		None		
14.3	Check alignment (report any abruptness in profile)		Proper		
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)		No Footpath		
15.2	Check missing footpath slabs		No Footpath		
15.3	Cleanliness of ducts along footpaths		No Footpath		
16	UTILITIES				
16.1	Check leakage of water and sewage pipes		Telecom		
16.2	Check any damage by telephone and electric cables		Spalling in crash barriers		
16.3	Check condition of lighting facilities		No lighting		
16.4	Check damages due to any other utilities		No damages		
17	BRIDGE NUMBER				
17.1	Check condition of painting		Good condition		
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness		None		
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.		None		
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)		Not applicable		
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention		Action recommended	Time by which to be completed	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
1	Expansion joints shall be cleaned and secured for leakage		
2	Drainage spouts shall be cleaned and projected		
3	Elastomeric bearings shall be replaced immediately		
4	Spalling shall be repaired for cantilever deck slab		
5	Spalling in Pier caps shall be repaired		
6	Spalling near end of girders shall be repaired		
7	Debris shall be cleaned from Pier caps		
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Major Bridge at Km 202.400 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 1.3 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Utilities



Pic - 2. 1 : Utilities


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 2 : Span Arrangement



Pic - 4. 0 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 1 : Type of Superstructure



Pic - 4. 2 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : No. of Girders



Pic - 6. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Bearings



Pic - 6. 2 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 3 : Bearings



Pic - 6. 4 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Condition of Superstructure



Pic - 7. 1 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 2 : Condition of Superstructure



Pic - 7. 3 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 7. 4 : Condition of Superstructure



Pic - 7. 5 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 6 : Condition of Superstructure



Pic - 7. 7 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 8 : Condition of Superstructure



Pic - 7. 9 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 0 : Pier Damage Images



Pic - 8. 1 : Pier Damage Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 0 : Substructure Damage Images



Pic - 9. 1 : Substructure Damage Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 2 : Substructure Damage Images



Pic - 10. 0 : Waterway damage images 1

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 10. 1 : Waterway damage images 1



Pic - 10. 2 : Waterway damage images 1




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 11. 0 : Abutment Stem Images



Pic - 12. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 12. 1 : Pier Stem Images



Pic - 12. 2 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 13. 0 : Return Wall Images



Pic - 13. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	205/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 204.300 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Gabions provided	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Gabions provided, good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	Not relevant to this structure	
	b) For Piers	Not relevant to this structure	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure	
6.2	Check any abnormal change in flow pattern	Not relevant to this structure	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure	
6.5	Check adequacy of waterway	Not relevant to this structure	
6.6	Check of erosion of bank	Not relevant to this	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	No metallic bearing




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Girders
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
	decks )		
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None	
10.1.10	Check damages if any due to moving vehicle	None	
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Runner & Down take pipe shall be provided	
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition	
10.1.13	Check excessive vibrations, if any	None	
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None	
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None	
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None	
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None	
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None	
10.1.19	Check peeling off of protective coat or paint	None	
10.2.0	Check steel members	Not a steel bridge	
10.2.1	Check condition of protective system	Not a steel bridge	
10.2.2	Check corrosion, if any	Not a steel bridge	
10.2.3	Check excessive vibrations, if any	Not a steel bridge	
10.2.4	Check alignment of members	Not a steel bridge	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No sliding plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not applicable
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Runner & Down take pipe shall be provided
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No damages	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			Good condition	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spout shall be cleaned		
2	Runner & down take pipe shall be provided		
3	Expansion joints shall be cleaned		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Vehicular Underpass at Km 204.300 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 4. 0 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Flyover



Pic - 7. 0 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 1 : Abutment Stem Images




Pic - 8. 0 : Return Wall Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	205/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 204.300 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Gabions, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Gabions provided	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Gabions provided, good condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	Not relevant to this structure	
	b) For Piers	Not relevant to this structure	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure	
6.2	Check any abnormal change in flow pattern	Not relevant to this structure	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure	
6.5	Check adequacy of waterway	Not relevant to this structure	
6.6	Check of erosion of bank	Not relevant to this	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
			structure
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any		not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc		not visible
7.3	Check damage due to impact of floating bodies, boulders, etc		not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.		Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)		Good condition
8.2	Check tilting, cracking, disintegration, decay and other damages, etc		No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)		No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct		None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)		No damages
8.6	Check damages to protective coating or paint.		No damages
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )		No bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges		No bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)		No bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)		No bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position		No bearing

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	No bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	No bearing
9.2.2	Check general cleanliness	No bearing
9.3	Concrete bearings	No bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No bearing
9.3.2	Check any excessive shifting	No bearing
9.3.3	Check loss of shape	No bearing
9.3.4	Check general cleanliness	No bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No bearing
9.5	Condition of d/s stoppers (for submersible bridges)	No bearing
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Balanced cantilever
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Runner & Down take pipe shall be provided
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No sliding plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not applicable
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Runner & Down take pipe shall be provided
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No damages	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			Good condition	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spout shall be cleaned		
2	Runner & down take pipe shall be provided		
3	Vegetation shall be cleaned from bridge deck		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

Vehicular Underpass at Km 204.300 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 3. 2 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Flyover


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 0 : Abutment Stem Images




Pic - 6. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 7. 0 : Return Wall Images




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Canal/ 205/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 204.600 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good, Spill through abutments
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	No metallic bearing
9.2	Elastomeric bearings (state numbers)	6
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging,	Good condition


Page 3 of 9.

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
	splitting, displacements, if any)		
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	None	
9.5	Condition of d/s stoppers (for submersible bridges)	Not submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	PSC Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating, etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices,	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	condition of hinges, splices, etc.)	
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap,	Strip seal, Debris are

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	excessive noise, etc.)	observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed	
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.1	Check general condition (check expansion gaps, missing parts if any etc)		Good condition		
14.2	Check damage due to collision		No damages		
14.3	Check alignment (report any abruptness in profile)		Proper		
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)		No Footpath		
15.2	Check missing footpath slabs		No Footpath		
15.3	Cleanliness of ducts along footpaths		No Footpath		
16	UTILITIES				
16.1	Check leakage of water and sewage pipes		Telecom		
16.2	Check any damage by telephone and electric cables		No damages		
16.3	Check condition of lighting facilities		No lighting		
16.4	Check damages due to any other utilities		No damages		
17	BRIDGE NUMBER				
17.1	Check condition of painting		Fair condition		
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness		None		
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.		None		
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)		Not applicable		
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention		Action recommended	Time by which to be completed	



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
1	Drainage spout shall be cleaned & projected		
2	Expansion joints shall be cleaned		
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 204.600 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2.0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 1 : Span Arrangement



Pic - 2. 2 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 4. 0 : No. of Girders



Pic - 4. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 6. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Abutment Stem Images



Pic - 7. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 1 : Pier Stem Images




Pic - 8. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Return Wall Images




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Irrigation Canal/ 205/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 204.600 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Canal lining, Fair condition	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	None	
	b) For Piers	None	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation	
6.2	Check any abnormal change in flow pattern	No such change	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None	
6.5	Check adequacy of waterway	Adequate	
6.6	Check of erosion of bank	No erosion	
7	FOUNDATION		
7.1	Check settlement, abnormal scour, tilting, if any	not visible	





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good, Spill through abutments	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No bearing	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No bearing	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No bearing	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	No bearing	
9.2	Elastomeric bearings (state numbers)	No bearing	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No bearing	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No bearing
9.3	Concrete bearings	No bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No bearing
9.3.2	Check any excessive shifting	No bearing
9.3.3	Check loss of shape	No bearing
9.3.4	Check general cleanliness	No bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No bearing
9.5	Condition of d/s stoppers (for submersible bridges)	No bearing
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Integral
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Good condition
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Fair
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	No damages

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			Spalling due to cables	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned				



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Minor Bridge at Km 204.600 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 3. 3 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : Bearings



Pic - 5. 0 : Waterway damage images 1




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images



Pic - 6. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images




Pic - 7. 1 : Return Wall Images

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	206/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 205.700 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Rigid flooring
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible





		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No bearings	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No bearings	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No bearings	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No bearings	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	No bearings	
9.2	Elastomeric bearings (state numbers)	No bearings	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No bearings	


Page 3 of 9.


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No bearings
9.3	Concrete bearings	No bearings
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No bearings
9.3.2	Check any excessive shifting	No bearings
9.3.3	Check loss of shape	No bearings
9.3.4	Check general cleanliness	No bearings
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No bearings
9.5	Condition of d/s stoppers (for submersible bridges)	No bearings
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Multicell Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	No debris
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Fair
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	No damages

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from the bridge deck & waterway				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--

Minor Bridge at Km 205.700 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 2. 2 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Bearings



Pic - 5. 0 : Substructure Damage Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Abutment Stem Images




Pic - 7. 0 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 0 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	206/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 205.700 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Rigid flooring
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL not marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No bearings	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No bearings	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No bearings	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No bearings	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	No bearings	
9.2	Elastomeric bearings (state numbers)	No bearings	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	No bearings	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	No bearings
9.3	Concrete bearings	No bearings
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No bearings
9.3.2	Check any excessive shifting	No bearings
9.3.3	Check loss of shape	No bearings
9.3.4	Check general cleanliness	No bearings
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No bearings
9.5	Condition of d/s stoppers (for submersible bridges)	No bearings
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Multicell Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Good condition
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	Not exposed
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Filler, Good condition
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	No debris	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	No damages	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned & projected				
2	Vegetation shall be cleaned from the bridge deck & waterway				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 205.700 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 0 : Bearings



Pic - 5. 0 : Abutment Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 1 : Abutment Stem Images



Pic - 6. 0 : Pier Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Return Wall Images




Pic - 7. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Bellary fly over
1.2	Name of Highway/ Location of bridge	NH 00044, Km 208.400 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Not present
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Not relevant to this structure
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Reinforced Earth, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	Not relevant to this structure	
	b) For Piers	Not relevant to this structure	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure	
6.2	Check any abnormal change in flow pattern	Not relevant to this structure	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure	
6.4	Check signs of abnormal afflux from U/S and D/S watermarks on piers if any	Not relevant to this structure	
6.5	Check adequacy of waterway	Not relevant to this structure	
6.6	Check of erosion of bank	Not relevant to this	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Not present
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not a metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not a metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not a metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	Not a metallic bearing


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	3
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Fair condition
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	PSC Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Not secured
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	No top plate
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spouts clogging shall be cleaned		
2	Runner pipe & down take pipes shall be provided for drainage		
3	Vegetation shall be cleaned from bridge deck		
4	Expansion joints shall be cleaned		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

Flyover at Km 208.400 – LT-LEFT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Utilities




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Type of Superstructure



Pic - 4. 1 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--



Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 2 : Bearings



Pic - 6. 3 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Flyover



Pic - 8. 0 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 8. 1 : Abutment Stem Images



Pic - 9. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 1 : Pier Stem Images




Pic - 10. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 10. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	-------------------------------------


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Bellary fly over
1.2	Name of Highway/ Location of bridge	NH 00044, Km 208.400 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Not present
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Not relevant to this structure
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	Reinforced Earth, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	Not relevant to this structure	
	b) For Piers	Not relevant to this structure	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure	
6.2	Check any abnormal change in flow pattern	Not relevant to this structure	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure	
6.5	Check adequacy of waterway	Not relevant to this structure	
6.6	Check of erosion of bank	Not relevant to this	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Not present
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not a metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not a metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not a metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	Not a metallic bearing




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	3
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Fair condition
9.2.2	Check general cleanliness	Clean
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	PSC Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	No damages
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	Not secured
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	No top plate
11.6	Check for debris in joints	Debris are observed
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spouts clogging shall be cleaned		
2	Runner pipe & down take pipes shall be provided for drainage		
3	Vegetation shall be cleaned from bridge deck		
4	Expansion joints shall be cleaned		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Flyover at Km 208.400 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 4. 2 : No. of Girders


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--



Pic - 5. 0 : Bearings

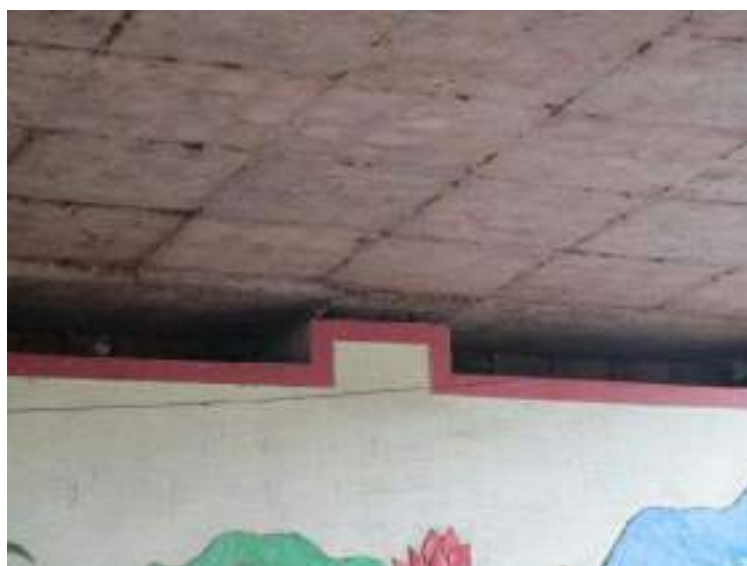


Pic - 5. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 5. 3 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 5. 4 : Bearings



Pic - 6. 0 : Condition of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Flyover



Pic - 7. 1 : Flyover




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Abutment Stem Images



Pic - 8. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 0 : Pier Stem Images



Pic - 9. 1 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 10. 0 : Return Wall Images



Pic - 10. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	210/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 209.400 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Poor condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation & debris
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not metallic bearing
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	None	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girders	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Debris are observed

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured	
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Fair	
11.9	Check alignment and clearance	Proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	No damages	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from the bridge deck & waterway				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
3		Expansion joints shall be cleaned	
4	Bridge number shall be painted again		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Minor Bridge at Km 209.400 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 1 : Span Arrangement



Pic - 3. 0 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : No. of Girders



Pic - 4. 2 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 3 : No. of Girders



Pic - 5. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 1 : Bearings



Pic - 5. 2 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 3 : Bearings



Pic - 5. 4 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 6. 1 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 2 : Condition of Superstructure



Pic - 6. 3 : Condition of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Pier Stem Images



Pic - 8. 1 : Pier Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 9. 0 : Return Wall Images



Pic - 9. 1 : Return Wall Images





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)

1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	210/2
1.2	Name of Highway/ Location of bridge	NH 00044, Km 209.400 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good condition
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Fair condition
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	No damages
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Fair condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Poor condition
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation & debris
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting, cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not metallic bearing	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not metallic bearing	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not metallic bearing	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not metallic bearing	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	None	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	RCC Girders	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	Not exposed	
10.1.4	Check wear of deck surface	Good	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	None	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged, Fair condition
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	Not box girder
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Damaged at A1	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Damaged at A1	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No top plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not finger joint
11.6	Check for debris in joints	Debris in joint
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	Fair
11.9	Check alignment and clearance	Proper
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	Clogged
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Not projected
13.3	Check adequacy thereof	Adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not a submersible bridge
14	HANDRAILS, PARAPETS, CRASH BARRIERS	
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition
14.2	Check damage due to collision	No damages

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			No damages	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Poor condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Drainage spout shall be cleaned				
2	Vegetation shall be cleaned from the bridge deck & waterway				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Expansion joints shall be cleaned		
4	Bridge number shall be painted again		
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--

#### Minor Bridge at Km 209.400 – RT-RIGHT




Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 1.3 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 2 : Span Arrangement



Pic - 3. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 1 : Type of Superstructure



Pic - 4. 0 : No. of Girders



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 4. 1 : No. of Girders



Pic - 4. 2 : No. of Girders




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Bearings



Pic - 5. 1 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : Bearings



Pic - 5. 3 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 5. 4 : Bearings



Pic - 5. 5 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Condition of Superstructure



Pic - 6. 1 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 2 : Condition of Superstructure



Pic - 6. 3 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 2 : Abutment Stem Images



Pic - 8. 0 : Pier Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 1 : Pier Stem Images



Pic - 9. 0 : Return Wall Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 1 : Return Wall Images



Pic - 9. 2 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	210/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 209.600 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS		
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure	
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure	
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure	
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure	
5.5	Check any abnormal scour noticed.		
	a) For Abutments	Not relevant to this structure	
	b) For Piers	Not relevant to this structure	
5.6	Reserve store material(check against specified quality)	None	
6	WATERWAY		
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure	
6.2	Check any abnormal change in flow pattern	Not relevant to this structure	
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure	
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure	
6.5	Check adequacy of waterway	Not relevant to this structure	
6.6	Check of erosion of bank	Not relevant to this	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	No damages
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No metallic bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	No metallic bearing

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	Not elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Not elastomeric bearing
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Runner & Down take pipe shall be provided
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the casting of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Asphaltic plug, Good
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No sliding plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not applicable
11.6	Check for debris in joints	None
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	No drainage spout
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Runner & Down take pipe shall be provided
13.3	Check adequacy thereof	Not adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spout with runner & down take pipe shall be provided		
2			
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
---	--	--


Vehicular Underpass at Km 209.600 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : Condition of Superstructure



Pic - 5. 1 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 0 : Flyover



Pic - 6. 1 : Flyover



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Abutment Stem Images



Pic - 7. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 0 : Return Wall Images




Pic - 8. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA

(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	210/3
1.2	Name of Highway/ Location of bridge	NH 00044, Km 209.600 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Not applicable
2	TYPE OF BRIDGE	
1	High level / Submersible	Not applicable
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	Good condition
4.4	Approach slab (Check settlement, cracks, movement etc.)	Good condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	Not relevant to this structure
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Not relevant to this structure
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Not relevant to this structure
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Not relevant to this structure
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	Not relevant to this structure
5.5	Check any abnormal scour noticed.	
	a) For Abutments	Not relevant to this structure
	b) For Piers	Not relevant to this structure
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Not relevant to this structure
6.2	Check any abnormal change in flow pattern	Not relevant to this structure
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	Not relevant to this structure
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	Not relevant to this structure
6.5	Check adequacy of waterway	Not relevant to this structure
6.6	Check of erosion of bank	Not relevant to this structure


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
		structure
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	not visible
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good condition
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Reinforcement exposed, Spalling of concrete
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	None
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	No metallic bearing
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	No metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	No metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	No metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position	No metallic bearing


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	and tightened)	
9.2	Elastomeric bearings (state numbers)	Not elastomeric bearing
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging, splitting, displacements, if any)	Not elastomeric bearing
9.2.2	Check general cleanliness	No elastomeric bearing
9.3	Concrete bearings	Not concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	Not concrete bearing
9.3.2	Check any excessive shifting	Not concrete bearing
9.3.3	Check loss of shape	Not concrete bearing
9.3.4	Check general cleanliness	Not concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	No cracks
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	RCC Box
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	Honey combing
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracking
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	Good
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of	None




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	decks )	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	None
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Runner & Down take pipe shall be provided
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	None
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	None
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	None
10.1.19	Check peeling off of protective coat or paint	None
10.2.0	Check steel members	Not a steel bridge
10.2.1	Check condition of protective system	Not a steel bridge
10.2.2	Check corrosion, if any	Not a steel bridge
10.2.3	Check excessive vibrations, if any	Not a steel bridge
10.2.4	Check alignment of members	Not a steel bridge


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	Not a steel bridge
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	Not a steel bridge
10.2.7	Check buckling, kinking, warping and waviness	Not a steel bridge
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	Not a steel bridge
10.2.9	Check apparent fracture if any	Not a steel bridge
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	Not a steel bridge
10.2.11	Check conditions inside the closed members	Not a steel bridge
10.30	Check masonry arches	Not a masonry arch
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not a masonry arch
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not a masonry arch
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not a masonry arch
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not a masonry arch
10.3.5	Check growth of vegetation.	Not a masonry arch
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Asphaltic plug, Good
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Good condition
11.3	Check secureness of the joints	Secured
11.4	Top sliding plate(check corrosion, damage to welds, etc.)	No sliding plate
11.5	Locking of joints(check locking of joints especially for finger type expansion joints.)	Not applicable
11.6	Check for debris in joints	None
11.7	Report rattling, if any	None
11.8	Check drainage from expansion joint	None
11.9	Check alignment and clearance	Properly aligned
12	WEARING COAT (CONCRETE/BITUMEN)	
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	None
12.3	Compare additional thickness with design thickness, with reference to kerb height	None
13	DRAINAGE SPOUTS AND VENT HOLES	
13.1	Check clogging, deterioration and damage, if any	No drainage spout
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Runner & Down take pipe shall be provided
13.3	Check adequacy thereof	Not adequate
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway
13.5	For submersible bridges, report on functioning	Not submersible bridge

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14	HANDRAILS, PARAPETS, CRASH BARRIERS				
14.1	Check general condition (check expansion gaps, missing parts if any etc)			Good condition	
14.2	Check damage due to collision			No damages	
14.3	Check alignment (report any abruptness in profile)			Properly aligned	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			No utilities	
16.2	Check any damage by telephone and electric cables			No utilities	
16.3	Check condition of lighting facilities			No utilities	
16.4	Check damages due to any other utilities			No utilities	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Good condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action	Time by which to

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU	
		recommended	be completed
1	Drainage spout with runner & down take pipe shall be provided		
2			
3			
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Vehicular Underpass at Km 209.600 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 2. 0 : Span Arrangement



Pic - 2. 1 : Span Arrangement

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Type of Superstructure



Pic - 3. 1 : Type of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Type of Superstructure



Pic - 4. 0 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--




Pic - 4. 1 : Bearings



Pic - 5. 0 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Substructure Damage Images



Pic - 6. 1 : Substructure Damage Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 2 : Substructure Damage Images



Pic - 7. 0 : Flyover

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 8. 0 : Abutment Stem Images



Pic - 8. 1 : Abutment Stem Images




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 0 : Return Wall Images



Pic - 9. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Hundri river / 211/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 210.100 (LT-LEFT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Fair condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory




	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	No protection
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)	
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Good condition
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages
8.6	Check damages to protective coating or paint.	No damages
9	BEARINGS	
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing, Completely damaged
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not metallic bearing
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not metallic bearing
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not metallic bearing
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not metallic bearing
9.2	Elastomeric bearings (state numbers)	4
9.2.1	Check condition; of pads (Oxidation, creep, flattening, bulging,	Severely damaged


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	splitting, displacements, if any)	
9.2.2	Check general cleanliness	Not clean
9.3	Concrete bearings	No concrete bearing
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing
9.3.2	Check any excessive shifting	No concrete bearing
9.3.3	Check loss of shape	No concrete bearing
9.3.4	Check general cleanliness	No concrete bearing
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	None
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge
10	SUPERSTRUCTURE	
10.1	Reinforced concrete and prestressed concrete members	PSC I Girder
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	None
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks
10.1.3	Check exposed reinforcement, if any	None
10.1.4	Check wear of deck surface	None
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling
10.1.6	Check surface stains and rust stains along with the locations	No stains
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	Leaching obserbed
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	Leakage observed
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices,	No steel members


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
	condition of hinges, splices, etc.)	
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members
10.2.7	Check buckling, kinking, warping and waviness	No steel members
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members
10.2.9	Check apparent fracture if any	No steel members
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members
10.2.11	Check conditions inside the closed members	No steel members
10.30	Check masonry arches	Not masonry bridge
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge
10.3.5	Check growth of vegetation.	Not masonry bridge
10.4	Check all cast iron/wrought iron components	Not a steel bridge
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge
11	EXPANSION JOINTS	
11.1	Functioning (cracks in wearing course, existence of normal gap,	Filler, Fair condition



	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
	excessive noise, etc.)		
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition	
11.3	Check secureness of the joints	Not secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	None	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Not proper	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.1	Check general condition (check expansion gaps, missing parts if any etc)		Good condition		
14.2	Check damage due to collision		None		
14.3	Check alignment (report any abruptness in profile)		Proper		
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)		No Footpath		
15.2	Check missing footpath slabs		No Footpath		
15.3	Cleanliness of ducts along footpaths		No Footpath		
16	UTILITIES				
16.1	Check leakage of water and sewage pipes		Telecom		
16.2	Check any damage by telephone and electric cables		Spalling in crash barriers		
16.3	Check condition of lighting facilities		No lighting		
16.4	Check damages due to any other utilities		No damages		
17	BRIDGE NUMBER				
17.1	Check condition of painting		Poor condition		
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness		None		
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.		None		
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)		Not applicable		
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention		Action recommended	Time by which to be completed	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
1	Expansion joints shall be secured for leakage				
2	Drainage spouts shall be cleaned				
3	Bridge number shall be painted again				
4	Debris shall be cleaned from Abutment & Pier cap top				
5	Elastomeric bearing shall be replaced				
6					
7					
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.				
	Date:-----			Signature of the Inspecting officer	
	Duration of Inspection:-----				
	From:_____Am/Pm				
	To:_____Am/Pm				
	Method of inspection				

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--


Major Bridge at Km 210.100 – LT-LEFT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 2. 0 : Utilities



Pic - 2. 1 : Utilities



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 3. 2 : Span Arrangement



Pic - 4. 0 : Type of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 1 : Type of Superstructure



Pic - 4. 2 : Type of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 2 : No. of Girders



Pic - 6. 0 : Bearings




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 1 : Bearings



Pic - 6. 2 : Bearings


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 6. 3 : Bearings



Pic - 6. 4 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 0 : Condition of Superstructure



Pic - 7. 1 : Condition of Superstructure



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 2 : Condition of Superstructure



Pic - 7. 3 : Condition of Superstructure

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 4 : Condition of Superstructure



Pic - 8. 0 : Pier Damage Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 1 : Pier Damage Images



Pic - 8. 2 : Pier Damage Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 3 : Pier Damage Images



Pic - 9. 0 : Return Wall Damage Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 9. 1 : Return Wall Damage Images



Pic - 9. 2 : Return Wall Damage Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 10. 0 : Substructure Damage Images



Pic - 10. 1 : Substructure Damage Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 11. 0 : Abutment Stem Images



Pic - 11. 1 : Abutment Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 11. 2 : Abutment Stem Images



Pic - 12. 0 : Pier Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 12. 1 : Pier Stem Images




Pic - 13. 0 : Return Wall Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 13. 1 : Return Wall Images


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--

### INSPECTION PROFORMA


(Check list for Inspection Report)


1	General	
1.1	Name of bridge/ No. of bridge/ Name of river	Hundri river / 211/1
1.2	Name of Highway/ Location of bridge	NH 00044, Km 210.100 (RT-RIGHT)
1.3	Design Scour Level at Pier (Lowest)	Data not available
2	TYPE OF BRIDGE	
1	High level / Submersible	High level
3	INSPECTION DATE	
a	Date of last such inspection by	Details not available
b	Date of last routine inspection by	Details not available
c	Traffic intensity PCU/T per day (The latest census)	Details not available
4	APPROACHES	
4.1	Condition of pavement surface (Check unevenness settlement, cracking, potholes etc.)	Bituminous, Good
4.2	Side slopes (Check pitched or un-pitched, condition of pitching/turfing, any signs of slope failure etc.)	Good condition
4.3	Erosion of Embankment by rain cuts or any other damage to Embankment.	No erosion
4.4	Approach slab (Check settlement, cracks, movement etc.)	Fair condition
4.5	Retaining wall condition (Check subsidence, tilting, condition of weep-holes, guard-stone and railing etc.)	RCC return walls, No damages
4.6	Accumulation of silt and debris on submersible approaches in cutting and embankment.	None
4.7	Approach geometrics (check whether it satisfies the standards in force)	Satisfactory





	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
5	PROTECTIVE WORKS	
5.1	Type (Mention whether guide-bund or protection around abutments or spurs.)	Stone Pitching
5.2	Check damage to the layout, cross section profile (check whether the layout and the general cross sections are in order.)	Good condition
5.3	Check condition of slope pitching, apron, and toe walls indicating the nature of damage if any (check for proper slope, thickness of pitching in the slopes, width and thickness of apron, erosion of toe walls, etc.)	Good condition
5.4	Check condition of floor protection works, indicate nature of damage if any (Condition if impervious floor, flexible apron, curtain walls, etc.)	No protection
5.5	Check any abnormal scour noticed.	
	a) For Abutments	None
	b) For Piers	None
5.6	Reserve store material(check against specified quality)	None
6	WATERWAY	
6.1	Check presence of obstruction, island formation, vegetation growth etc.	Vegetation
6.2	Check any abnormal change in flow pattern	No such change
6.3	Check maximum flood level observed during the year and mark the same on the pier/abutment both on the U/S and D/S (Local enquiry if necessary)	HFL marked
6.4	Check signs of abnormal aflux from U/S and D/S watermarks on piers if any	None
6.5	Check adequacy of waterway	Adequate
6.6	Check of erosion of bank	No erosion
7	FOUNDATION	
7.1	Check settlement, abnormal scour, tilting, if any	not visible




		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
7.2	Check cracking, disintegration, decay, erosion, cavitation etc	Not visible	
7.3	Check damage due to impact of floating bodies, boulders, etc	No damages	
7.4	For sub-ways, report seepage, vehicle impact, if any damage to the foundations, etc.	Not a subway	
8	SUBSTRUCTURE (piers,abutments, return walls and wing walls)		
8.1	Check efficiency of drainage of the backfill behind abutments (Check functioning of weep holes, evidence of moisture on abutment faces, etc.)	Good	
8.2	Check tilting, cracking, disintegration, decay and other damages, etc	Good condition	
8.3	Check condition of side retaining walls like cracking, disintegration and seepage, if any(For Subways)	No damages	
8.4	Check large excavations done in the road below in the vicinity of flyover or road over bridge of viaduct	No damages	
8.5	Check damages to protective measures to pier and abutments (for viaducts, flyover and ROB)	No damages	
8.6	Check damages to protective coating or paint.	No damages	
9	BEARINGS		
9.1	Metallic bearings (State types/ Sliding plate/ Rocker Roller/ PTFE/ Pot )	Elastomeric bearing	
9.1.1	Check general condition ( rusting,cleanliness, seizing of plates), silting, accumulation of dirt in case of submersible bridges	Not metallic bearing	
9.1.2	Functioning (check excessive movement, tilting, jumping off guides)	Not metallic bearing	
9.1.3	Greasing (Check date of last greasing/ oil bath and whether to be redone or not)	Not metallic bearing	
9.1.4	Effectiveness of anchor bolts (check whether they are in position and tightened)	Not metallic bearing	
9.2	Elastomeric bearings (state numbers)	4	
9.2.1	Check condition; of pads (Oxidation,creep,flattening,bulging,splitting,displacements, if any)	Good condition	


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
9.2.2	Check general cleanliness	Clean	
9.3	Concrete bearings	No concrete bearing	
9.3.1	Check any signs of distress (cracking, spalling, disintegrating, staining, dishing etc)	No concrete bearing	
9.3.2	Check any excessive shifting	No concrete bearing	
9.3.3	Check loss of shape	No concrete bearing	
9.3.4	Check general cleanliness	No concrete bearing	
9.4	Check cracks if any in supporting members (abutment cap, pier cap, pedestal)	None	
9.5	Condition of d/s stoppers (for submersible bridges)	Not a submersible bridge	
10	SUPERSTRUCTURE		
10.1	Reinforced concrete and prestressed concrete members	PSC I Girder	
10.1.1	Check spalling disintegration or honey combing, (special attention: to be given at points of bearings)	None	
10.1.2	Check cracking ( pattern, location, depth, crack width explain preferably by photograph and plotting on sketch. A map of cracking should be produced. The size and distribution of cracks and their penetration should be noted)	No cracks	
10.1.3	Check exposed reinforcement, if any	None	
10.1.4	Check wear of deck surface	None	
10.1.5	Check scaling (This is gradual and continuous loss of surface mortar and aggregate over irregular areas.)	No scaling	
10.1.6	Check surface stains and rust stains along with the locations	No stains	
10.1.7	Check leaching (Effects are most usually evident on the soffits of decks )	No leaching	
10.1.8	Check corrosion of reinforcements, sheathing and tendons if visible	None	
10.1.9	Check leakage (Leakage of water can take place through concrete decks, construction joints or thin component sections of the deck viz., kerbs, etc.)	No leakage	


	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.1.10	Check damages if any due to moving vehicle	None
10.1.11	Check condition of drainage system (spouts, collection pits, grating,etc)	Clogged
10.1.12	Check condition of articulation (Cracks, exposed reinforcement if any)	Good condition
10.1.13	Check excessive vibrations, if any	None
10.1.14	Check excessive deflections (sag) or loss of camber if any at same point each time	No such observation
10.1.15	Check cracks, if any, around anchorage zone for prestressed concrete members	None
10.1.16	Check excessive deflection (sag) at central hinge, tip, of cantilever for cantilever bridge	None
10.1.17	In box girders, the interior faces of flanges and webs need to be examined for signs of cracking and report excessive accumulation of water or debris. Interior diaphragms will also require examination, particularly for any signs of cracking at their junction to the webs	No such observation
10.1.18	Check accumulation of silt and debris on surface of deck (for submersible bridges)	Not submersible bridge
10.1.19	Check peeling off of protective coat or paint	None
10.20	Check steel members	No steel members
10.2.1	Check condition of protective system	No steel members
10.2.2	Check corrosion, if any	No steel members
10.2.3	Check excessive vibrations, if any	No steel members
10.2.4	Check alignment of members	No steel members
10.2.5	Check condition for connections (adequacy, looseness of rivets, bolts or worn-out welds, specially on connection of stringers to cross girders, cross girders to main girders, gussets or splices, condition of hinges, splices, etc.)	No steel members
10.2.6	Check excessive loss of camber and excessive deflections and deformations, if any	No steel members


		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
10.2.7	Check buckling, kinking, warping and waviness	No steel members	
10.2.8	Check on the cleanliness of members and joints (check choking of drainage holes provided in the bottom booms)	No steel members	
10.2.9	Check apparent fracture if any	No steel members	
10.2.10	Check excessive wear (such as in pins in joints of truss) and their locations requiring close monitoring	No steel members	
10.2.11	Check conditions inside the closed members	No steel members	
10.30	Check masonry arches	Not masonry bridge	
10.3.1	Check condition of joints mortar, pointing masonry, etc.	Not masonry bridge	
10.3.2	Check profile, report flattening by observing rise of the arch at centre and quarter points	Not masonry bridge	
10.3.3	Check cracks (indicate location, pattern, extent, depth; explain by sketches)	Not masonry bridge	
10.3.4	Check drainage of spandrel fillings (check bulging of spandrel walls, if any)	Not masonry bridge	
10.3.5	Check growth of vegetation.	Not masonry bridge	
10.4	Check all cast iron/wrought iron components	Not a steel bridge	
10.4.1	These materials occur in older bridges and the defects which they exhibit are in general very similar to those described above the steel. It should be recognized that the homogeneity and purity of the material will not be upto the present day standards of steel. As such the inspection process has to take into account the variability of materials. (Blow holes and cracking are probably the main defects that occur during the causing of the metal and its cooling.)	Not a steel bridge	
11	EXPANSION JOINTS		
11.1	Functioning (cracks in wearing course, existence of normal gap, excessive noise, etc.)	Strip seal, Debris are observed	
11.2	Check condition of sealing material (for neoprene sealing material, check for splitting, oxidation, creep, flattening, bulging and for bitumen filler., check hardening, cracking, etc.)	Fair condition	

		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
11.3	Check secureness of the joints	Not secured	
11.4	Top sliding plate (check corrosion, damage to welds, etc.)	No top plate	
11.5	Locking of joints (check locking of joints especially for finger type expansion joints.)	Not finger joint	
11.6	Check for debris in joints	Debris are observed	
11.7	Report rattling, if any	None	
11.8	Check drainage from expansion joint	Not proper	
11.9	Check alignment and clearance	Not proper	
12	WEARING COAT (CONCRETE/BITUMEN)		
12.1	Check surface condition (cracks, spalling, disintegration, pot holes, etc)	Good condition	
12.2	Check evidence of wear (Tell-Tale rings, check for thickness as against actual thickness, date of last inspection)	No wear	
12.3	Compare additional thickness with design thickness, with reference to kerb height	Not required	
13	DRAINAGE SPOUTS AND VENT HOLES		
13.1	Check clogging, deterioration and damage, if any	Clogged	
13.2	Check the projection of the spout on the underside (see whether structural members are being affected)	Projected	
13.3	Check adequacy thereof	Adequate	
13.4	For subways report about adequacy of drainage and pumping arrangements, etc.	Not a subway	
13.5	For submersible bridges, report on functioning	Not a submersible bridge	
14	HANDRAILS, PARAPETS, CRASH BARRIERS		
14.1	Check general condition (check expansion gaps, missing parts if any etc)	Good condition	
14.2	Check damage due to collision	None	



		2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU	
14.3	Check alignment (report any abruptness in profile)			Proper	
15	FOOTPATHS				
15.1	Check general condition (damage due to mounting of vehicles)			No Footpath	
15.2	Check missing footpath slabs			No Footpath	
15.3	Cleanliness of ducts along footpaths			No Footpath	
16	UTILITIES				
16.1	Check leakage of water and sewage pipes			Telecom	
16.2	Check any damage by telephone and electric cables			Spalling in crash barriers	
16.3	Check condition of lighting facilities			No lighting	
16.4	Check damages due to any other utilities			No damages	
17	BRIDGE NUMBER				
17.1	Check condition of painting			Fair condition	
18	ENVIRONMENT				
18.1	Check for signs of aggressiveness			None	
19	AESTHETICS				
19.1	Check any visual intrusion, hoardings, vegetation on structural members, etc.			None	
19.2	Check whether all actions for maintenance and repairs recommended during last inspection have been done or not (give details)			Not applicable	
20	MAINTENANCE AND IMPROVEMENT RECOMMENDATION				
S.No	Item needing attention			Action recommended	Time by which to be completed
1	Expansion joints shall be cleaned and secured for leakage				
2	Drainage spouts shall be cleaned				

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)		BRIDGE INSPECTION REPORT USING MBIU
3	Bridge number shall be painted again		
4			
5			
6			
7			
21	Certificate to be accorded by the inspecting official Certified that I have personally inspected this bridge.		
	Date:-----	Signature of the Inspecting officer	
	Duration of Inspection:-----		
	From:_____Am/Pm		
	To:_____Am/Pm		
	Method of inspection		

	2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)	BRIDGE INSPECTION REPORT USING MBIU
--	--	--


Major Bridge at Km 210.100 – RT-RIGHT



Pic - 1.0 : Total Width/Cross Section



Pic - 1.1 : Total Width/Cross Section


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 1.2 : Total Width/Cross Section



Pic - 2. 0 : Utilities

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 3. 0 : Span Arrangement



Pic - 3. 1 : Span Arrangement




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 4. 0 : Type of Superstructure



Pic - 4. 1 : Type of Superstructure


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 5. 0 : No. of Girders



Pic - 5. 1 : No. of Girders


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 6. 0 : Bearings



Pic - 6. 1 : Bearings

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 6. 2 : Bearings



Pic - 6. 3 : Bearings



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 7. 0 : Condition of Superstructure



Pic - 7. 1 : Condition of Superstructure




	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 7. 2 : Condition of Superstructure



Pic - 8. 0 : Abutment Stem Images


	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--



Pic - 8. 1 : Abutment Stem Images



Pic - 8. 2 : Abutment Stem Images

	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
--	---	--




Pic - 9. 0 : Pier Stem Images



Pic - 9. 1 : Pier Stem Images



	<p>2349 - Consultancy services as Independent Engineer Services during Operation Maintenance stage of 4 - laned divided carriageway from Km. 22.300(Thondupalli) to Km. 211.000 (Kurnool) of Package No.s NS - 2 BOT AP - 3, AP - 4 AP - 5 on Hyderabad - Bangalore section of NH - 44 (Old NH No. 7) in the State of Telangana Andhra Pradesh on BOT (Toll Annuity) basis Under North - South Corridor (NHDP Phase - II)</p>	<p>BRIDGE INSPECTION REPORT USING MBIU</p>
---	---	--



Pic - 10. 0 : Return Wall Images



■ QUALITY CONTROL SHEET

DOCUMENT	Technical Due Diligence Report of NH44 (NH7) –Stretch of Kothakota Bypass – Kurnool Highway					
PROJECT	Preparation of report on physical condition of the national highways on roads under (the National Highways Infra Trust)					
CODE	IM4663-FR-STRETCH_4 (Annexure-C)					
AUTHOR	INITIALS					
	DATE	March -2021				
VERIFIED	INITIALS					
	DATE	March -2021				
RECIPIENT	National Highways Authority of India					
NOTES						
TECHNICAL CONSULTANT	Tecnica Y Proyectos, S.A (TYPSA) In JV with AVANZA Engineering Pvt. Ltd. D-75 VASHALI NAGAR JAIPUR (RAJ.), 302021 TEL NO. – 0141 - 4022513					



## ANNEXURE-C

- ▣ ANNEXURE 1 TRAFFIC PROJECTIONS
- ▣ ANNEXURE 2 OPERATION AND MAINTENANCE COST
- ▣ ANNEXURE 3 INITIAL IMPROVEMENT COST

## ANNEXURE1TRAFFIC PROJECTIONS

Physical Condition of the National Highways on Roads Under (The National Highways Infra Trust)

TRAFFIC PROJECTIONS AND CAPACITY ANALYSIS

PULLUR TOLL

Year	Car/Jeep	Mini LCV	Mini Bus	Bus	LCV	2-axle truck	3-axle truck	MAV	OS (+6)	HCM/EME	Total Vehicles	Total PCUs	% Growth
2021	11,563	1198	105	1037	1012	1609	1,423	2,974	83	62	21,066	40,680	
2022	11,563	1,198	105	1,037	1,012	1,609	1,423	2,974	83	62	21,066	40,680	0%
2023	11,919	1,248	110	1,079	1,055	1,569	1,370	3,099	87	65	21,600	41,595	2%
2024	12,303	1,303	114	1,125	1,101	1,528	1,317	3,236	90	68	22,185	42,611	2%
2025	12,686	1,358	119	1,172	1,148	1,489	1,268	3,373	94	70	22,778	43,653	2%
2026	13,234	1,438	126	1,239	1,215	1,437	1,203	3,572	100	75	23,638	45,180	3%
2027	13,732	1,512	132	1,301	1,278	1,383	1,136	3,756	105	78	24,414	46,548	3%
2028	14,249	1,589	139	1,366	1,343	1,331	1,073	3,949	110	83	25,234	48,015	3%
2029	14,786	1,671	146	1,435	1,412	1,282	1,014	4,153	116	87	26,100	49,585	3%
2030	15,342	1,757	153	1,506	1,485	1,234	958	4,366	122	91	27,015	51,259	3%
2031	15,920	1,847	161	1,582	1,561	1,188	905	4,591	128	96	27,979	53,043	3%
2032	16,432	1,928	167	1,649	1,630	1,141	853	4,793	134	100	28,828	54,610	3%
2033	16,962	2,013	175	1,720	1,701	1,097	804	5,004	140	105	29,719	56,267	3%
2034	17,508	2,101	182	1,793	1,776	1,054	758	5,224	146	109	30,650	58,017	3%
2035	18,071	2,193	190	1,870	1,854	1,013	714	5,454	152	114	31,625	59,861	3%
2036	18,653	2,289	198	1,950	1,935	973	673	5,694	159	119	32,643	61,804	3%
2037	19,166	2,375	205	2,021	2,007	933	632	5,908	165	123	33,538	63,507	3%
2038	19,694	2,464	213	2,095	2,083	895	594	6,130	171	128	34,468	65,290	3%
2039	20,236	2,557	221	2,172	2,161	859	558	6,361	178	133	35,435	67,155	3%
2040	20,793	2,653	229	2,251	2,242	824	525	6,600	185	138	36,439	69,103	3%
2041	21,366	2,752	237	2,333	2,326	790	493	6,849	191	143	37,480	71,136	3%
2042	21,869	2,840	244	2,406	2,401	756	462	7,069	198	148	38,393	72,914	2%
2043	22,383	2,931	252	2,482	2,478	724	433	7,296	204	152	39,335	74,761	3%
2044	22,910	3,025	260	2,559	2,557	693	406	7,531	211	157	40,309	76,679	3%
2045	23,449	3,123	268	2,639	2,639	664	380	7,773	217	162	41,314	78,668	3%
2046	24,001	3,223	276	2,722	2,724	635	356	8,023	224	168	42,352	80,730	3%
2047	24,484	3,311	284	2,794	2,798	607	333	8,243	230	172	43,258	82,528	2%
2048	24,977	3,402	291	2,869	2,875	580	311	8,470	237	177	44,189	84,385	2%
2049	25,479	3,495	299	2,946	2,954	554	290	8,703	243	182	45,146	86,301	2%
2050	25,992	3,591	307	3,025	3,035	529	271	8,942	250	187	46,129	88,277	2%

## TRAFFIC GROWTH RATES AT INTERVAL OF FIVE YEARS

Vehicle Type	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26-30	FY 31 -35	FY 36 -40	FY 41-45	FY 46-50
Car	0.00%	3.08%	3.22%	3.11%	4.32%	3.77%	3.22%	2.75%	2.35%	2.01%
Bus	0.00%	4.09%	4.28%	4.13%	5.73%	5.00%	4.28%	3.66%	3.13%	2.67%
LCV	0.00%	4.20%	4.39%	4.24%	5.89%	5.13%	4.39%	3.75%	3.21%	2.74%
2 AT	0.00%	-2.50%	-2.62%	-2.53%	-3.51%	-3.74%	-3.91%	-4.08%	-4.26%	-4.46%
3 AT	0.00%	-3.69%	-3.86%	-3.73%	-5.18%	-5.52%	-5.77%	-6.02%	-6.29%	-6.58%
MAV	0.00%	4.21%	4.41%	4.25%	5.90%	5.15%	4.40%	3.76%	3.22%	2.75%

## TRAFFIC GROWTH RATES

Year	Car/Jeep	Mini LCV	Mini Bus	Bus	LCV	2-axle truck	3-axle truck	MAV	OS (+6)	HCM/EME
2021	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2022	3.08%	4.20%	4.09%	4.09%	4.20%	-2.50%	-3.69%	4.21%	4.21%	4.21%
2023	3.22%	4.39%	4.28%	4.28%	4.39%	-2.62%	-3.86%	4.41%	4.41%	4.41%
2024	3.11%	4.24%	4.13%	4.13%	4.24%	-2.53%	-3.73%	4.25%	4.25%	4.25%
2025	4.32%	5.89%	5.73%	5.73%	5.89%	-3.51%	-5.18%	5.90%	5.90%	5.90%
2026	3.77%	5.13%	5.00%	5.00%	5.13%	-3.74%	-5.52%	5.15%	5.15%	5.15%
2027	3.77%	5.13%	5.00%	5.00%	5.13%	-3.74%	-5.52%	5.15%	5.15%	5.15%
2028	3.77%	5.13%	5.00%	5.00%	5.13%	-3.74%	-5.52%	5.15%	5.15%	5.15%
2029	3.77%	5.13%	5.00%	5.00%	5.13%	-3.74%	-5.52%	5.15%	5.15%	5.15%
2030	3.77%	5.13%	5.00%	5.00%	5.13%	-3.74%	-5.52%	5.15%	5.15%	5.15%
2031	3.22%	4.39%	4.28%	4.28%	4.39%	-3.91%	-5.77%	4.40%	4.40%	4.40%
2032	3.22%	4.39%	4.28%	4.28%	4.39%	-3.91%	-5.77%	4.40%	4.40%	4.40%
2033	3.22%	4.39%	4.28%	4.28%	4.39%	-3.91%	-5.77%	4.40%	4.40%	4.40%
2034	3.22%	4.39%	4.28%	4.28%	4.39%	-3.91%	-5.77%	4.40%	4.40%	4.40%

Year	Car/Je ep	Mini LCV	Mini Bus	Bus	LCV	2-axle truck	3-axle truck	MAV	OS (+6)	HCM/ EME
2035	3.22%	4.39%	4.28%	4.28%	4.39%	-3.91%	-5.77%	4.40%	4.40%	4.40%
2036	2.75%	3.75%	3.66%	3.66%	3.75%	-4.08%	-6.02%	3.76%	3.76%	3.76%
2037	2.75%	3.75%	3.66%	3.66%	3.75%	-4.08%	-6.02%	3.76%	3.76%	3.76%
2038	2.75%	3.75%	3.66%	3.66%	3.75%	-4.08%	-6.02%	3.76%	3.76%	3.76%
2039	2.75%	3.75%	3.66%	3.66%	3.75%	-4.08%	-6.02%	3.76%	3.76%	3.76%
2040	2.75%	3.75%	3.66%	3.66%	3.75%	-4.08%	-6.02%	3.76%	3.76%	3.76%
2041	2.35%	3.21%	3.13%	3.13%	3.21%	-4.26%	-6.29%	3.22%	3.22%	3.22%
2042	2.35%	3.21%	3.13%	3.13%	3.21%	-4.26%	-6.29%	3.22%	3.22%	3.22%
2043	2.35%	3.21%	3.13%	3.13%	3.21%	-4.26%	-6.29%	3.22%	3.22%	3.22%
2044	2.35%	3.21%	3.13%	3.13%	3.21%	-4.26%	-6.29%	3.22%	3.22%	3.22%
2045	2.35%	3.21%	3.13%	3.13%	3.21%	-4.26%	-6.29%	3.22%	3.22%	3.22%
2046	2.01%	2.74%	2.67%	2.67%	2.74%	-4.46%	-6.58%	2.75%	2.75%	2.75%
2047	2.01%	2.74%	2.67%	2.67%	2.74%	-4.46%	-6.58%	2.75%	2.75%	2.75%
2048	2.01%	2.74%	2.67%	2.67%	2.74%	-4.46%	-6.58%	2.75%	2.75%	2.75%
2049	2.01%	2.74%	2.67%	2.67%	2.74%	-4.46%	-6.58%	2.75%	2.75%	2.75%
2050	2.01%	2.74%	2.67%	2.67%	2.74%	-4.46%	-6.58%	2.75%	2.75%	2.75%



## ANNEXURE 2 OPERATION AND MAINTENANCE

Physical condition of the National Highways on Roads under (The National Highways Infra Trust)

OPERATION AND MAINTENANCE ESTIMATES SUMMARY SHEET

															Cap
	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34	FY35	FY36
Routine Maintenance	0.0	0.0	0.0	0.0	0.0	5.8	11.5	11.5	8.3	12.2	11.5	11.5	11.5	11.5	0.0
Toll Plaza Operation and Maintenance	4.5	4.5	4.3	4.3	4.3	5.3	4.3	12.7	4.3	4.4	5.3	4.3	4.3	4.3	3.0
Electricity & Patrolling expenses	0.5	0.5	1.4	1.4	1.4	2.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Other office expenses	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Insurance	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
GST @ 12%	1.3	1.3	1.4	1.4	1.4	2.3	3.0	4.0	2.6	3.0	3.1	3.0	3.0	3.0	1.4
Total	12.2	12.2	13.0	13.0	13.0	21.4	27.7	37.0	24.0	28.4	28.7	27.6	27.6	27.6	13.2
Major Maintenance/Periodic Maintenance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.2	0.0	0.0	0.0	0.0	0.0	0.0

	Aug	DLP														
	FY37	FY38	FY39	FY40	FY41	FY42	FY43	FY44	FY45	FY46	FY47	FY48	FY49	FY50	FY51	TOTAL
Routine Maintenance	0.0	0.0	0.0	0.0	0.0	0.0	12.5	16.1	16.1	16.1	16.1	17.1	11.6	16.1	16.1	249.8
Toll Plaza Operation and Maintenance	3.0	3.9	3.9	3.9	3.9	3.9	15.9	5.3	5.3	5.3	5.3	5.3	14.9	5.3	5.3	175.8
Electricity & Patrolling expenses	3.0	3.3	3.3	3.3	3.3	3.3	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	90.7
Other office expenses	4.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	160.9
Insurance	1.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	69.1
GST @ 12%	1.4	1.9	1.9	1.9	1.9	1.9	4.9	4.1	4.1	4.1	4.1	4.2	4.7	4.1	4.1	89.5
Total	13.2	17.9	17.9	17.9	17.9	17.9	45.8	38.0	38.0	38.0	38.0	39.1	43.6	38.0	38.0	785.6
Major Maintenance/Periodic Maintenance	0.0	0.0	0.0	0.0	0.0	0.0	104.5	0.0	0.0	0.0	0.0	0.0	108.6	0.0	0.0	296.2

## OPERATION AND MAINTENANCE COST

Kothakota-Kurnool Section 75.592 kms		Under Annuity Period Till September 206													
OPEX COST BASED ON YEAR 2020-2021		Periodic Renewal													
Maintenance Cost Yearly															
S.No.	Expenditures Heads	Year1 FY22	Year2 FY23	Year3 FY24	Year4 FY25	Year5 FY26	Year6 FY27	Year7 FY28	Year8 FY29	Year9 FY30	Year10 FY31	Year11 FY32	Year12 FY33	Year13 FY34	Year14 FY35
A	Routine Maintenance														
1	BT Pavement (31 Kms) at MCW @ 7lacs/km/year for 2010-2011 (add esclation @5% per year from 2010-2011 to 2020-2021 $7 \times 1.05^{10} = 11.40$ lacs/km/year ) As per attched circular NHAI/11033/CGM(Fin)/2011 Note:- In periodic maintenance years routine maintenance is considered 70% of above cost	0.00	0.00	0.00	0.00	0.00	4.31	8.62	8.62	6.03	8.62	8.62	8.62	8.62	8.62
2	Service and Slip roads (21.560 kms) Junctions Bus bays and Truck lays etc (taken 60% of 7lacs/km/year for 2010-2011, $7 \times 0.6 = 4.2$ lacs/km/year for 2010-2011), (add esclation @5% per year from 2010-2011 to 2020-2021 $4.2 \times 1.05^{10} = 6.84$ lacs/km/year ) As per attched circular NHAI/11033/CGM(Fin)/2011 Note:- In periodic maintenance years routine maintenance is considered 70% of above cost	0.00	0.00	0.00	0.00	0.00	0.92	1.84	1.84	1.29	1.84	1.84	1.84	1.84	1.84
3	Equipment Based Survey Works (Annual/Periodic as per Maintenance Schedule)	0.00	0.00	0.00	0.00	0.00	0.38	0.75	0.75	0.75	1.37	0.75	0.75	0.75	0.75
4	Contingency @ 3 % of toal cost	0.00	0.00	0.00	0.00	0.00	0.17	0.34	0.34	0.24	0.35	0.34	0.34	0.34	0.34
	Total Periodic Maintenance cost =	0.00	0.00	0.00	0.00	0.00	5.77	11.54	11.54	8.31	12.18	11.54	11.54	11.54	11.54
B	Toll Plaza Operation and Maintenance														

Kothakota-Kurnool Section 75.592 kms		Under Annuity Period Till September 206													
OPEX COST BASED ON YEAR 2020-2021		Periodic Renewal													
Maintenance Cost Yearly															
S.No.	Expenditures Heads	Year1 FY22	Year2 FY23	Year3 FY24	Year4 FY25	Year5 FY26	Year6 FY27	Year7 FY28	Year8 FY29	Year9 FY30	Year10 FY31	Year11 FY32	Year12 FY33	Year13 FY34	Year14 FY35
1	Toll plaza and Operation and maintenance charges @ 0.2 cr /lane (1.6/8=0.2, consider 8 lanes) (0.2*1.05 <sup>10</sup> =0.326) (proposed 12 lane) No of Plaza's=1 As per attached circular NHAI/11033/CGM(Fin)/2011 Note:- After 100% ETC implementation of toll plaza operation and maintenance cost 60% considered from Yr-2024	3.91	3.91	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
2	System Integrator maintenance charges @ 0.048 cr/lane (0.048*1.05, 5% esclation=0.0504) (proposed 12 lane) No of Plaza's=1 As per current market price and audited expenses sheets (Rs 0.38 cr for 8 lanes = 0.048 rs./lane, add esclation @ 5% on 0.048 = 0.0504 rs/lane))	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
3	ATMS	0.00	0.00	1.39	1.39	1.39	1.39	1.39	9.74	1.37	1.41	1.37	1.37	1.37	1.37
4	TMS	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00
	Total Toll Plaza Operation and Maintenance =	4.51	4.51	4.34	4.34	4.34	5.34	4.34	12.69	4.32	4.36	5.31	4.32	4.32	4.32
C	Electricity & Patrolling expenses @ 1.25 lacs/km/year for 2010-11 (add esclation @5% per year from 2010-2011 to 2020-2021 1.25x1.05 <sup>10</sup> = 2.03 lacs/km/year )	0.00	0.00	0.00	0.00	0.00	0.77	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
1	RPV and Ambulance Services	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
2	Electricity consumption charges for ATMS	0.00	0.00	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Total Electricity and Patrolling Charges	0.53	0.53	1.45	1.45	1.45	2.22	2.98	2.98	2.98	2.98	2.98	2.98	2.98	2.98
D	Other office expenses (Rs. 2.5 cr/year for 2010-2011 (add esclation @5% per year from 2010-2011 to 2020-2021 2.5x1.05 <sup>10</sup> = 4.07 cr/year )	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07	4.07
E	Insurance	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
	Yealy O&M Cost (A+B+C+D+E)	10.87	10.87	11.62	11.62	11.62	19.15	24.69	33.04	21.44	25.34	25.66	24.67	24.67	24.67
F	Add GST @ 12% on total O&M Cost	1.30	1.30	1.39	1.39	1.39	2.30	2.96	3.96	2.57	3.04	3.08	2.96	2.96	2.96
	Yearly Total O&M Cost Yearly incl. GST	12.17	12.17	13.01	13.01	13.01	21.44	27.66	37.00	24.01	28.38	28.74	27.63	27.63	27.63
	Yealy O&M Cost/Kms	0.16	0.16	0.17	0.17	0.17	0.28	0.37	0.49	0.32	0.38	0.38	0.37	0.37	0.37

	Kothakota-Kurnool Section 75.592 kms	Construction Period for Capacity Augmentation	Defect Liability Period of 5 Years					Periodic Renewal															
	OPEX COST BASED ON YEAR 2020-2021																						
	Maintenance Cost Yearly																						
S.No.	Expenditures Heads	Year15 FY36	Year16 FY37	Year17 FY38	Year18 FY39	Year19 FY40	Year20 FY41	Year21 FY42	Year22 FY43	Year23 FY44	Year24 FY45	Year25 FY46	Year26 FY47	Year27 FY48	Year28 FY49	Year29 FY50	Year30 FY51						
A	Routine Maintenance																						
1	BT Pavement (31 Kms) at MCW @ 7lacs/km/year for 2010-2011 (add esclation @5% per year from 2010-2011 to 2020-2021 $7 \times 1.05^{10} = 11.40$ lacs/km/year ) As per attched circular NHAI/11033/CGM(Fin)/2011 Note:- In periodic maintenance years routine maintenance is considered 70% of above cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.05	12.93	12.93	12.93	12.93	12.93	9.05	12.93	12.93						
2	Service and Slip roads (21.560 kms) Junctions Bus bays and Truck lays etc (taken 60% of 7lacs/km/year for 2010-2011, $7 \times 0.6 = 4.2$ lacs/km/year for 2010-2011), (add esclation @5% per year from 2010-2011 to 2020-2021 $4.2 \times 1.05^{10} = 6.84$ lacs/km/year ) As per attched circular NHAI/11033/CGM(Fin)/2011 Note:- In periodic maintenance years routine maintenance is considered 70% of above cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	1.84	1.84	1.84	1.84	1.84	1.29	1.84	1.84						
3	Equipment Based Survey Works (Annual/Periodic as per Maintenance Schedule)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.90	0.90	0.90	0.90	1.83	0.90	0.90	0.90						
4	Contingency @ 3 % of toal cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.47	0.47	0.47	0.47	0.50	0.34	0.47	0.47						
	Total Periodic Maintenance cost =	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.53	16.14	16.14	16.14	16.14	17.09	11.57	16.14	16.14						
B	Toll Plaza Operation and Maintenance																						



	Kothakota-Kurnool Section 75.592 kms	Construction Period for Capacity Augmentation	Defect Liability Period of 5 Years							Periodic Renewal						Periodic Renewal		
	OPEX COST BASED ON YEAR 2020-2021																	
	Maintenance Cost Yearly																	
S.No.	Expenditures Heads	Year15 FY36	Year16 FY37	Year17 FY38	Year18 FY39	Year19 FY40	Year20 FY41	Year21 FY42	Year22 FY43	Year23 FY44	Year24 FY45	Year25 FY46	Year26 FY47	Year27 FY48	Year28 FY49	Year29 FY50	Year30 FY51	
1	Toll plaza and Operation and maintenance charges @ 0.2 cr /lane (1.6/8=0.2, consider 8 lanes) (0.2*1.05 ^ 10, 5% escalation=0.326) (proposed 12 lane) No of Plaza's=1 As per attached circular NHAI/11033/CGM(Fin)/2011 Note:- After 100% ETC implementation of toll plaza operation and maintenance cost 60% considered from Yr-2024	2.35	2.35	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	
2	System Integrator maintenance charges @ 0.048 cr/lane (0.048*1.05, 5% escalation=0.0504) (proposed 12 lane) No of Plaza's=1 As per current market price and audited expenses sheets (Rs 0.38 cr for 8 lanes = 0.048 rs./lane, add escalation @ 5% on 0.048 = 0.0504 rs/lane))	0.60	0.60	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
3	ATMS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.76	1.37	1.37	1.37	1.37	1.37	9.74	1.37	1.37	
4	TMS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	
	Total Toll Plaza Operation and Maintenance =	2.95	2.95	3.93	3.93	3.93	3.93	3.93	15.91	5.31	5.31	5.31	5.31	5.31	14.89	5.31	5.31	
C	Electricity & Patrolling expenses @ 1.25 lacs/km/year for 2010-11 (add escalation @5% per year from 2010-2011 to 2020-2021 1.25x1.05 ^ 10 = 2.03 lacs/km/year )	1.53	1.53	1.83	1.83	1.83	1.83	1.83	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
1	RPV and Ambulance Services	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	
2	Electricity consumption charges for ATMS	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
	Total Electricity and Patrolling Charges	2.98	2.98	3.27	3.27	3.27	3.27	3.27	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	
D	Other office expenses (Rs. 2.5 cr/year for 2010-2011 (add escalation @5% per year from 2010-2011 to 2020-2021 2.5x1.05 ^ 10 = 4.07 cr/year )	4.07	4.07	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	
E	Insurance	1.75	1.75	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	
	Yearly O&M Cost (A+B+C+D+E)	11.76	11.76	15.94	15.94	15.94	15.94	15.94	40.93	33.93	33.93	33.93	33.93	34.88	38.95	33.93	33.93	
F	Add GST @ 12% on total O&M Cost	1.41	1.41	1.91	1.91	1.91	1.91	1.91	4.91	4.07	4.07	4.07	4.07	4.19	4.67	4.07	4.07	

	<u>Kothakota-Kurnool Section 75.592 kms</u>	Construction Period for Capacity Augmentation		Defect Liability Period of 5 Years						Periodic Renewal														
	<u>OPEX COST BASED ON YEAR 2020-2021</u>																							
	Maintenance Cost Yearly																							
S.No.	Expenditures Heads	Year15 FY36	Year16 FY37	Year17 FY38	Year18 FY39	Year19 FY40	Year20 FY41	Year21 FY42	Year22 FY43	Year23 FY44	Year24 FY45	Year25 FY46	Year26 FY47	Year27 FY48	Year28 FY49	Year29 FY50	Year30 FY51							
	Yearly Total O&M Cost Yearly incl. GST	13.17	13.17	17.85	17.85	17.85	17.85	17.85	45.84	38.00	38.00	38.00	38.00	39.07	43.62	38.00	38.00							
	Yearly O&M Cost/Kms	0.17	0.17	0.24	0.24	0.24	0.24	0.24	0.61	0.50	0.50	0.50	0.50	0.52	0.58	0.50	0.50							

### ANNEXURE3INITIAL IMPROVEMENT COST

B

(UNDER the National Highways Infrastructure Investment Trust (InvIT) of Kothakota Bypass – Kurnool Section (from km 135+469to km 211+000) of NH-44 in the State of Telangana)			
<b>ABSTRACT</b>			
<b>Based on Rate Analysis 2020-21</b>			
Sr no.	Particulars	Amount in Rs.	Amount in Crores
1	Toll Plaza	15400000	1.54
2	Intersections Improvements	98899153	9.89
3	Miscellaneous Items (Road Marking, Drain, Street Light etc.)	200577692	20.06
4	Service Roads/Service Lanes	429063293	42.91
5	Bus/ Truck Lay Bays	8086786.	0.81
6	FO/VUP/PUP/MNB and RE wall and Approaches	925509512	92.55
7	Culverts	15447971	1.54
8	ATMS & TMS	201625390	20.16
	<b>Total</b>	<b>1894609800</b>	<b>189.46</b>
	<b>Add GST @ 12 % on total cost</b>	<b>227353176</b>	<b>22.74</b>
	<b>Sub Total</b>	<b>2121962976</b>	<b>212.20</b>
	<b>Contingency Charges @ 5.0 %</b>	<b>106098148</b>	<b>10.61</b>
	<b>Total Amount =</b>	<b>2228061125</b>	<b>222.81</b>

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item No.
<b>Bill No. 1 Toll Plaza</b>							
1.00	WIM (Weigh in Motion) Extra Wide Lane Slow	Nos.	2.00	700,000.00	1,400,000	Market Rate	
1.01	WIM (Weigh in Motion) Medium	Nos.	12.00	975,000.00	11,700,000	Market Rate	
1.02	Static Weigh Bridge with Room	Nos.	2.00	1,150,000.00	2,300,000	Market Rate	
				<b>Total</b>	<b>15400000</b>		
<b>Bill No. 2 Intersections Improvements</b>							
2.00	Subgrade	Cum	27,919.20	512.00	14294630.4	Rate Analysis	3.18
2.01	GSB Layer	Cum	10,274.88	2,815.00	28923787.2	Rate Analysis	4.1 - A - II
2.02	WMM	Cum	8,112.00	2,996.00	24303552	Rate Analysis	4.12
2.03	Prime coat	Sqm	32,472.00	23.00	746856	Rate Analysis	5.1
2.04	Tack coat over Granular surface	Sqm	32,472.00	9.00	292248	Rate Analysis	5.2
2.05	Tack coat over Bituminous surface	Sqm	30,432.00	9.00	273888	Rate Analysis	5.2
2.06	DBM	Cum	1,530.00	9,423.00	14417190	Rate Analysis	5.6 II
2.07	BC	Cum	1,166.40	10,429.00	12164385.6	Rate Analysis	5.8 II
2.08	Clearing and grubbing	Hec	43.14	35,134.00	1515765.082	Rate Analysis	2.3 II A
2.09	Earthen shoulder	Cum	3,252.00	444.00	1443888	Rate Analysis	3.16
2.10	Stop line	Sqm	565.07	655.00	370119.54	Rate Analysis	8.13
				<b>Total</b>	<b>98899153.82</b>		
<b>Bill No. 3 Miscellaneous Items</b>							
3.00	Edge Line marking for MCW , Service Road & Junctions	Sqm	4,490.70	655.00	2941408.5	Rate Analysis	8.13
3.01	center line marking for MCW , Service Road & Junctions	sqm	498.97	655.00	326823.1667	Rate Analysis	8.13
3.02	Road Studs	Nr.	2,217.33	492.00	1090928	Rate Analysis	8.35
3.03	Road Signs						
a)	Route marker	sqm	48.00	3,266.00	156768	Rate Analysis	8.4 II
b)	Stop/Give way Sign, Octagonal	Nr.	24.00	4,676.00	112224	Rate Analysis	8.4 I
c)	1200 X 900 junction sign Board	sqm	48.00	16,704.00	801792	Rate Analysis	8.6
3.04	Street Light Single Arm 9 mtr height including	Nr.	466.00	45,000.00	20970000	Rate Analysis	8.27



### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	Providing fixing and Wiring complete in all respect.						
3.05	Street Light Double Arm 11 mtr height including Providing fixing and Wiring complete in all respect.	Nr.	206.00	50,000.00	10300000	Rate Analysis	8.27
3.06	Road Marking	Sqm	1,224.00	655.00	801720	Rate Analysis	8.13
3.07	Single W beam crash Barrier	m	7,960.00	3,335.00	26546600	Rate Analysis	8.23 A
3.08	Rain Water Harvesting Structure	Nos	38	500,000	19000000	Market Rate	
3.09	LED Solar Blinker	Nos	342.00	6,200.00	2120400	Market Rate	
3.10	Kerbs Median/Service road	m	150.00	241.00	36150	Rate Analysis	8.1 - B
3.11	Lightened bollard	Nr.	96.00	1,265.00	121440	R-9-64	
3.12	Speed Breaker Strip	Rmt.	792.00	750.00	594000	Market Rate	
3.13	Pedestrian Crossing	Sqm	4,200.00	655.00	2751000	Rate Analysis	
3.14	Stop Line	Sqm	565.07	655.00	370119.54	Rate Analysis	
3.15	Pedestrian Railing	Lin.m	2,560.00	3,139.00	8,035,840	Market Rate	
3.16	Footpath cum Covered Drain	Rmt.	10,580.00	7,065.92	74757479.23	Rate Analysis	
3.17	Clearing & Repairing of Drain (for Widening of Service/Slip road)	Rmt.	9,389.00	2,000.00	18778000	Rate Analysis	
3.18	Typical Public Charging Station (PCS)	Nr.	3.00	2,955,000	8865000	Market Rate	
3.19	Solar Panel (10 KW Tata Solar Panels) (Area required = 1000 sqft)	Nr.	2.00	550,000	1100000	Market Rate	
				<b>Total</b>	<b>200577692.4</b>		
<b>Bill no. 4 Service Roads/Service Lanes</b>							
4.00	Clearing and grubbing of road land including uprooting rank vegetation, grass, brush shrubs, saplings and trees of girth upto 300 mm, removal of stumps, disposal of unserviceable material and stacking of serviceable material upto 100 meters from road	Ha.	188.51	35,134.00	6622945.21	Rate Analysis	2.3 II A

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	boun						
4.01	Construction of embankment with approved material from <b>BORROW PITS</b> with all leads and lifts complete as per drawings and Technical Specification Clause No. 301 & 305 (with an average <b>distance of transport of 10 KM</b> )	Cu. m.	56,551.59	444.00	25108905.96	Rate Analysis	3.16
4.02	Construction of Sub grade & earthen / unpaved shoulders satisfying the requirements of minimum 4% CBR value as indicated in the drawings and specification with approved material with all leads & lifts all complete as per Technical Specification Clause	Cu. m.	88,261.95	512.00	45190118.4	Rate Analysis	3.18
4.03	Earthwork in filling of earthen shoulder with selected earth complete as per Technical Specification Clause 407 with all leads and lifts.	Cu. m.	348.98	512.00	178675.2	Rate Analysis	3.18
4.04	Loosening of the ground upto a level of 500 mm below the sub-grade level, watered, graded and compacted in layers to meet requirement of table 300-2 for sub-grade construction as per Technical specifications and as directed by the Engineer-in-charge.	100/sqm	1,885.05	109.00	2054.70777	Rate Analysis	3.19 Case I
4.05	Constructing Grannular Sub-base complete as per Technical Specification Clause No 401. Grading-I, Table 400-2.	Cu. m.	32,509.12	2,815.00	91513172.8	Rate Analysis	4.1 - A - II
4.06	Constructing Wet Mix Macadam base profile (including	Cu. m.	37,641.05	2,996.00	112772585.8	Rate Analysis	4.12

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	corrective course) complete as per Technical specification Clause No 406.						
4.07	Providing and laying bituminous primer coat over prepared surface of grannular base with bituminous emulsion complete as per Technical Specifications Clause No 502.(Table 500-1)	Sqm	150,564.2 0	22.00	3312412.4	Rate Analysis	5.1
4.08	Providing and laying Tack coat over granular surface with bituminous emulsion all complete as per Technical Specifications Clause 503.(Table 500-2) @ 2.5 kg /10 sq.m.	Sqm	144,573.5 0	8.00	1156588	Rate Analysis	5.2
4.09	Providing and laying Tack coat over bituminous courses with Bituminous emulsion all complete as per Technical Specifications Clause 503.(Table 500-2) @ 2.0 kg/10 sq.m.	Sqm	144,573.5 0	8.00	1156588	Rate Analysis	5.2
4.10	Providing and laying Dense Bituminous Macadam course as per Technical Specification Clause No.507.						
a)	B) Grading -II- ( Min 4.5% Bituminous Binder by weight of total mixture)	Cu. m.	8,674.41	9,423	81738965.43	Rate Analysis	5.6 II
4.11	Providing and laying Bituminous Concrete wearing course using Modified Bitumen ( PMB 40 )complete as per Technical Specifications Caluse 509 & 521.						
b)	A) With VG 30 Grade Bitumen (60/70 Grade)	Cu. m.	5,782.94	10,429	60310281.26	Rate Analysis	5.8 II
				<b>Total</b>	<b>429063293.2</b>		
<b>Bill No. 5 Bus/ Truck Lay Bays</b>							
5.00	Subgrade	Cum	1,022.75	512.00	523,648.00	Rate Analysis	3.18
5.01	GSB	Cum	573.10	2,815.00	1,613,276.50	Rate Analysis	4.1 - A - II
5.02	WMM	Cum	592.75	2,996.00	1,775,879.00	Rate Analysis	4.12
5.03	Prime coat over WMM	Sqm	2,341.00	23.00	53,843.00	Rate	5.1

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
						Analysis	
5.04	Tack coat over Granular Surface	Sqm	2,341.00	9.00	21,069.00	Rate Analysis	5.2
5.05	Tack Coat over Bituminous Surface	Sqm	2,341.00	9.00	21,069.00	Rate Analysis	5.2
5.06	Passenger shelters	Nr.	1.00	300,000.00	300,000.00	Market Rate	
5.07	Pedestrian guard rail	Lin.m	15.00	3,386.00	50,790.00	Market Rate	
5.08	Chequered Tiles	Sqm	52.50	534.00	28,035.00	Market Rate	
5.09	Kerb (L type)	Lin.m	470.00	241.00	113,270.00	Rate analysis	
5.10	Earth fill in raised median	Cum	236.96	444.00	105,210.46	Rate Analysis	3.16
5.11	Bollards	Nr.	4.00	2,339.00	9,356.00	Market Rate	
5.12	PCC M-15 grade Median Openings	Cum	3.05	5,086.00	15,512.30	Rate Analysis	12.8 A
5.13	Lettering	per cm ht. per lette	90.00	0.80	72.00	Rate Analysis	8.3-(II)
5.14	Barrier lane marking	Sqm	57.50	655.00	37,662.50	Rate Analysis	8.13
5.15	Drinking water koisk	Nr.	1.00	50,000.00	50,000.00	Market Rate	
5.16	Kerb painting	sqm	199.75	94.00	18,776.50	Rate Analysis	8.8
5.17	Chevron Marking	Sqm	91.88	655.00	60,181.40	Rate Analysis	8.13
5.18	Straight Arrows	Sqm	20.00	100.00	2,000.00	R-9-11-i	
5.19	Combi Arrows	Sqm	1.00	100.00	100.00	R-9-11-i	
5.2	Pedestrian crossing	Sqm	4.38	655.00	2,865.63	Rate Analysis	8.13
5.21	DBM	Cum	165.64	9,423.00	1,560,825.72	Rate Analysis	5.6 II
5.22	BC	Cum	83.32	10,429.00	868,944.28	Rate Analysis	5.8 II
5.23	Litter Bins	Nr.	2.00	2,200.00	4,400.00	Market Rate	
5.24	Bore Well	Nr.	1.00	500,000.00	500,000.00	Market Rate	
5.25	Toilet Block	Nr.	1.00	350,000.00	350,000.00	Market Rate	
				<b>Total</b>	<b>8,086,786.29</b>		
<b>Bill No. 6 FO/VUP/PUP/MNB and RE wall and Approaches</b>							
6.00	New Vehicular Under passes (1 x 12 x 5.5 ) & MNB				114,420,096		

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
6.01	Earth work in excavation in ordinary soil/rock for foundation of Bridges as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material all complete as per Technical specifications and as directed by the Engineer-in-charge.	cum	816.48	108.00	88,179.84	Rate Analysis	12.1 B-I
6.02	Providing and laying Reinforced cement concrete in sub-structure, mechanically mixed and compacted, including centering and shuttering but excluding cost of reinforcement, all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.						
	RCC Grade M35 for Substructure	cum	590.08	6,933.00	4,091,017.71	Rate Analysis	13.5 q Case II
6.03	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure including centering and shuttering but excluding cost of reinforcement, complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.						
a)	RCC Grade M40 for Superstructure(RCC Girder,Pedestal & Restrainer)	cum	198.62	7,059.00	1,402,080.11	Rate Analysis	14.1 D case-I (ii)-q
b)	PSC Grade M45 for Superstructure (PSC Girder)	cum	246.25	7,145.00	1,759,485.24	Rate Analysis	14.1 F (i)-r
6.04	Supplying, fitting and placing HYSD bar Fe500 reinforcement complete as per drawings and Technical specifications and as directed by the						



### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	Engineer-in-charge.						
a)	For Foundation	MT	35.43	69,800.00	2,472,745.97	Rate Analysis	12.40
b)	For Substructure/Box Structure	MT	61.42	70,047.00	4,302,547.67	Rate Analysis	13.6
c)	For Superstructure	MT	45.65	71,750.00	3,275,483.19	Rate Analysis	14.2
6.05	Providing & Laying HT Steel (LRS) in Pre/Post Tensioned Girder Superstructure complete as per Technical Specifications & Drawings	MT	13.64	147,119.00	2,006,886.09	Rate Analysis	14.3
6.06	Providing and laying Plain cement concrete M-15 for levelling course of approach slab, mechanically mixed and compacted complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.	cum	29.16	4,891.00	142,621.56	Rate Analysis	14.10
6.07	Providing and laying Reinforced cement concrete of M30 grade for approach slab including reinforcement and formwork all complete as per drawings and Technical specifications and as directed by the Engineer-in-charge.	cum	66.15	8,691.00	574,909.65	Rate Analysis	14.11
6.08	Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-40 grade concrete with HYSD reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH -	m	134.88	3,354.00	452,387.52	Rate Analysis	8.22 (i)

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.						
6.09	Providing and fixing PVC 100mm dia Service Ducts /Down Take pipes all complete as per drawing and technical specifications and as directed by the Engineer-in-charge.	m	82.00	565.00	46,330.00	Market Rate	
6.10	Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation complete as per Technical specifications and as directed by the Engineer-in-charge.	m	58.00	12,468.00	723,144.00	Rate Analysis	14.22
6.11	Providing and fixing POT cum PTFE bearing to the true line and level and in position as per drawings and BS:5400, Sec. 9.1 & 9.2 so as to impart full and even bearing on the seats and free movements / restraints as specified including cost of all material (tonnes)						
a)	450	Tonne Capacity	0.00	516.00	0.00	Rate Analysis	13.13

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
b)	250	Tonn e Cap acity	2,000.00	516.00	1,032,000.00	Rate Analysis	13.13
c)	100	Tonn e Cap acity	200.00	516.00	103,200.00	Rate Analysis	13.13
6.12	Providing and Laying in position 65 mm thick wearing coat consisting of 25 mm thick layer of Mastic Asphalt over deck slab and 40 mm thick bituminous concrete complete as per drawings, Technical Specification Sections 500 and 2700 and as directed by Engineer.	sqm	1,888.32	617.00	1,165,093.44	Rate Analysis	5.14
6.13	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face all complete as per Technical specifications and as directed by the Engineer-in-charge.	Each	176.00	98.00	17,248.00	Rate Analysis	13.8
6.14	Providing and fitting Drainage Spouts complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	Each	8.00	1,588.00	12,704.00	Rate Analysis	14.9
6.15	Providing and laying of PCC M15 levelling course 150mm thick below the pile cap.	cum	26.50	4,748.00	125,822.00	Rate Analysis	12.39
6.16	Providing and laying Cement concrete for reinforced concrete of Grade M 35 in pile cap complete as per drawing, Technical Specification Sections 1000, 1100, 1500, 1700 and 2100 with all leads and lifts and as directed by Engineer.	cum	322.06	5,495.00	1,769,697.72	Rate Analysis	12.38 C (ii)

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
6.17	Board cast-in-place vertical M35 grade R.C.C. Pile excluding Reinforcement complete as per Drawing and & Technical Specification						
	1.2 m	m	641.60	9,267.00	5,945,707.20	Rate Analysis	12.28
6.18	Providing Steel Liner for Pile including Fabricating and Setting out as per Detailed Drawing.	MT	38.60	88,992.00	3,435,437.43	Rate Analysis	12.40
6.19	Pile Load Test on single Vertical Pile in accordance with IS:2911(Part-IV)						
a)	Initial Load Test I Pile (Vertical + Lateral)	Mtr	50.00	300.00	15,000.00	Market Rate	
b)	Working Pile - Dynamic Pile Load Test	Mtr	50.00	5,000.00	250,000.00	Market Rate	
6.20	Providing painting, figuring and numbering to bridges/culvert upto 6m. Span complete with Synthetic Enamel Paint, two coats on new work, complete as per Technical Specification Section 800 and as approved by Engineer.	nos	2.00	59.00	118.00	Rate Analysis	14.16
6.21	Providing Reinforced earth retaining wall for approaches and ramps facia panels	sqm	30,310.70	2,112.00	64,016,198.40	Market rate	
6.22	Construction of embankment with approved material from BORROW PITS with all leads and lifts complete as per drawings and Technical Specification Clause No. 301 & 305 (with an average distance of transport of 10 KM)	Cu. m.	340,168.28	444.00	151,034,716.32	Rate Analysis	3.16
6.23	(iii) Providing and constructing RCC crash barrier with friction slab M 40 grade including cost of centering, shuttering and reinforcement as per approved Drawings and Technical Specifications	Rmt.	5,456.00	13,671.00	74,588,976.00	Market Rate	
6.24	Filter media (300 mm thick)behind RE wall	Cu. m.	8,448.72	1,341.00	11,329,733.52	Rate Analysis	13.10

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
6.25	Excavation in RE wall in ordinary soil	Cum	103,118.40	108.00	11,136,787.20	Rate Analysis	12.1 B-I
6.26	Geotextile	Sqm	369,631.50	583.00	215,495,164.50	Rate Analysis	7.3
6.27	PCC M-15 in levelling pad	Cu. m.	982.08	5,086.00	4,994,858.88	Rate Analysis	12.8 A
6.28	Providing PVC Downtake Pipe on side of RE Wall	Nr.	1,394.01	565.00	787,614.52	Market Rate	
6.29	Sub Grade	Cum	40,920.0	512.00	20,951,040.00	Rate Analysis	3.18
6.30	GSB	Cum	16,368.0	2,815.00	46,075,920.00	Rate Analysis	4.1 - A - II
6.31	WMM	Cum	20,460.0	2,996.00	61,298,160.00	Rate Analysis	4.12
6.32	Prime coat	Sqm	76,384.0	23.00	1,756,832.00	Rate Analysis	5.1
6.33	Tack coat	Sqm	152,768.0	9.00	1,374,912.00	Rate Analysis	5.2
6.34	DBM	Cum	8,402.2	9,423.00	79,174,307.52	Rate Analysis	5.6 II
6.35	BC	Cum	3,055.4	10,429.00	31,864,349.44	Rate Analysis	5.8 II
				<b>Total</b>	<b>925,509,513</b>		
<b>Bill no. 7 Culverts (Pipe/Box/Slab)</b>							
7.00	Earthwork in excavation of foundation for structures including pipe culverts in all types of soil including lead & lifts complete as per drawings and MORT&H specifications clauses 304 & 2903.	Cum .	2,082.45	108.00	224,904	Rate Analysis	12.1 B-1
7.01	Providing filter media behind abutments, wing walls, return walls and box structures with well packed materials to specified thickness with smaller size towards the soil and bigger size towards the wall with all leads and lifts complete as per drg. and MORT&H specifications clauses 305 & 309	Cum .	377.60	1,341.00	506,355	Rate Analysis	13.10
7.02	Cement Concrete / Reinforced Cement Concrete in open foundation / levelling course including centering and shuttering but excluding						



### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	reinforcement all complete as per drg. and MORT&H specifications sections 1500, 1700 and 2100.						
	b) M-15 grade	Cum .	138.56	5,086.00	704,696	Rate Analysis	12.8 A
7.03	Cement Concrete / Reinforced Cement Concrete in sub-structure including form work but excluding reinforcement complete as per drg. and MORT&H specifications sections 1500, 1700 and 2200.						
	d) M-30 grade	Cum .	194.34	5,504.00	1,069,658	Rate Analysis	13.5 G (p) Case ii
7.04	Supplying, fitting & placing in position HYSD / TMT bar reinforcement complete as per drg. and MORT&H specifications sections 1600. Foundation / Sub-structure / Superstructure	MT	67.90	70,047.00	4,755,954	Rate Analysis	13.6
7.05	Providing weep holes in brick masonry / plain / reinforced concrete abutment, wing walls / return wall with 100mm dia AC pipe, extending through the full width of structure with slope of IV:20H towards draining face complete as per drg. and MORT&H specifications clause 2706.	Nr.	528.00	98.00	51,744	Rate Analysis	13.8
7.06	Providing & laying stone boulder apron complete as per drg. & MORT&H specifications section 2500.	Cum .	420.67	1,828.00	768,990	Rate Analysis	15.1
7.07	Providing & laying filter material underneath stone boulder pitching on slopes complete as per drg. and MORT&H specifications section 2500.	Cum .	65.39	1,603.00	104,826	Rate Analysis	15.5
7.08	Providing & laying stone boulder pitching on slopes complete as per	Cum .	130.79	1,828.00	239,079	Rate Analysis	15.4

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	drg. and MORT&H specifications section 2500.						
7.09	Providing cement concrete in curtain wall complete as per drg. and MORT&H specifications sections 1500, 1700, 2100, 2200 & clause 2507.						
	a) M-15 grade	Cum	146.12	5,086.00	743,163	Rate Analysis	15.10 B
7.10	b) Providing cement concrete crash barrier in M-40 grade including safety kerb, reinforcement and G.I. pipe complete as per drawing & MORT&H Specifications sections 1500, 1600, 1700, 2200 & clause 809.	Cum	41.20	3,354.00	138,185	Rate Analysis	8.22
7.11	Painting of crash barrier as technical specification & drawing clause 2500	Sqm.	45.32	94.00	4,260	Rate Analysis	8.8
7.12	Back filling for cone	cum	194.72	1,412.00	274,945	Rate Analysis	13.9 A
7.13	Providing Reinforced Cement Concrete M-30 grade in box culvert including centering and shuttering but excluding reinforcement complete as per drg. and MORT&H specifications sections 1500, 1700, 2100, 2200 & 2300.						
	M 30	Cum	465.19	5,504.00	2,560,406	Rate Analysis	13.5 G (p) Case ii
7.14	Dismantaling						
a	Parapet wall	m	41.20	423.00	17,428	Rate Analysis	2.4 - II A
b	Return wall RCC	cum	158.60	788.00	124,978	Rate Analysis	2.4 - II B
	RCC/PCC Grade M20	cum	328.94	5,293.00	1,741,089		
	1200mm dia. (internal)	rmt	48.00	17,029.00	817,392		
	Printing of culvert No. and span arrangement of any shade with synthetic enamel paint black	Nos	16.00	200.00	3,200	Market Rate	

### BILL OF QUANTITIES

Sr.No.	Description	Unit	Quantity	Rate (Rs)	Amount(Rs)	BSR Ref.	Item
	Providing & placing first class granular bedding for pipe culvert complete as per drawing & technical specification clause 2904	Cum	130.89	2,815.00	368,452		
	Painting	sqm	240.26	90.00	21,623	Market Rate	
	Parapet Wall (M-20)	cum	39.04	5,293.00	206,647		
				<b>Total</b>	<b>15,447,971</b>		

BILL NO. - 8 ATMS Revised Estimate -Kothakota-Kurnool						
	Length	75	Junctions	7	minor junctions	36
			TMC	1	Toll Plaza	1
			Sub-Centre	0	PIU	1
ATMS 2020 policy						
Sr. No.	ATMS Component	Unit	Qty	Rate	Total	Remarks
1	Traffic Monitoring Camera System Equipment (TMCS)					
1.1	PTZ Camera	Nos.	75	185,000	13,875,000	
1.2	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Nos.	75	49,140	3,685,500	
1.3	Cabinet & 12m Pole with 1m arm at 8m	Nos.	75	45,728	3,429,600	To be replaced during road widening
1.4	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand	Nos.	75	45,000	3,375,000	
1.5	Solar System with UPS, Li-on battery & Pole with SPD, and lighting protection	Nos	75	95,260	7,144,500	
1.6	Industrial 5-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	75	25,000	1,875,000	
1.7	Any other item(s) considered necessary to comply with the Scope of Works				-	
Sub-Total (TMCS)					<b>33,384,600</b>	
2	Video Incident Detection System Equipment (VIDS)		7			
2.1	VIDS Camera - 4 per location	Set	28	80,000	2,240,000	
2.2	Warning amber lights with hooters and solar with at least 96 hours backup, pole and foundation (10 nos. at each	Set	7	74,026	518,182	

	junction/ location)					
2.3	Local Processing unit (LPU)	Nos.	7	100,000	700,000	
2.4	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	7	45,000	315,000	
2.5	Cabinet & 12m Pole with 1m arm at 8m	Nos.	7	45,728	320,096	To be replaced during road widening
2.6	Chamber / Manhole and Pole Foundation, PCC, backfilling with sand	Set	7	95,260	666,820	
2.7	Solar System with UPS/PCU, 48 hour battery & Pole with SPD, and lighting protection	Nos.	7	104,021	728,147	
2.8	Standalone Solar powered Amber Flasher Light of 500 mm Dia with at least 96 hours backup, Pole & Foundation (2 at each median opening)	Nos.	86	10,000	860,000	
2.9	Industrial 8-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	7	55,000	385,000	
2.10	Any other item(s) considered necessary to comply with the Scope of Works					
<b>Sub-Total (VIDS)</b>					<b>6,733,245</b>	
3	<b>Fibre cable-OFC</b>					
3.1	Supply of 24 core single mode armored OFC Multitube (TEC G-652) (Loop 10-15 Mtr every MH/HH) + all accessories	Mtr	82500	35	2,887,500	To be replaced during road widening
3.2	40 mm PLB HDPE duct as per latest TSEC specifications + all accessories	Mtr	82500	65	5,362,500	
3.3	Trenching of 1.5 meters, Laying & Backfilling for PLB HDPE duct, cable pulling, chambers lowering, etc.	Mtr	82500	240	19,800,000	
3.4	1m x 1m x 1.8m (depth) chambers (with concrete cover) with proper reinforcement and minimum M25 grade at every 250m	Nos.	75	15,000	1,125,000	
3.5	24 core OFC LIU - Bamboo Type	Nos	75	2,500	187,500	
3.6	Fiber Patch Cord Single Mode - 2 Mtr Length	Nos	40	1,281	51,240	
3.7	SFP - 20 km Transmission range	Nos	4	4,800	18,000	
3.8	Any other item(s) considered necessary to comply with the					

	Scope of Works					
<b>Sub-Total (OFC)</b>					<b>29,431,740</b>	
<b>4</b>	<b>Traffic Management Centre &amp; Sub-Centre</b>					
4.1	TMC & Sub-centre Central Processing Server in hot standby configuration (Primary + Secondary)	Nos.	2	2,400,000	4,800,000	
4.2	Video Recording Server with storage (minimum 360 TB)	Nos.	2	2,400,000	4,800,000	
4.3	Backup Video Recording (Only Incidents) Server with 240 TB storage	Nos.	1	2,400,000	2,400,000	
4.4	Facility Monitoring System Controller	Nos.	1	186,200	186,200	
4.5	Graphic Display 4x2 (70" Laser DLP/ 0.9mm Pixel LED)	Set	1	9,600,000	9,600,000	
4.6	Graphic Display Controller and software including Video Switches	Set	1	0	-	
4.7	Internet & SMS Server	Nos.	1	186,200	186,200	
4.8	Command Centre Operator Console with 4 nos. 21 inch touchscreen monitors	Nos.	6	121,943	731,658	
4.9	USB joystick to control PTZ cameras	Nos.	3	85,000	255,000	
4.10	Emergency Telephone (1033) console with 2 nos. 21 inch touchscreen monitors	Nos.	2	105,000	210,000	
4.11	Facility Monitoring System Console with 2 nos. 21 inch touchscreen monitors	Nos.	1	105,000	105,000	
4.12	Operations Laser Printer (Colour)	Nos.	1	387,082	387,082	
4.13	Operations Laser Printer (Black)	Nos.	1	66,933	66,933	
4.14	Firewall, IDS, IPS, Core Switch, and Network Equipment (Bidder shall attach the breakup of Network equipment with unit price of each item)	LS	1	1,582,770	1,582,770	
4.15	Aadhar enabled Biometric Fingerprint machine	Nos.	2	75,000	150,000	
4.16	Power Distribution Board (PDB)	LS	1	149,114	149,114	
4.17	Rack 24"	Nos.	1	51,500	51,500	
4.18	Maintenance Equipment as per ToR and site requirement	LS	1	2,500,000	2,500,000	
4.19	Surge Protection Device (SPD)	LS	4	200,000	800,000	
4.20	Lighting protection	LS	4	100,000	400,000	



4.21	Advance Driver Advisory System (ADAS), GPS tracker, industrial grade rugged (Waterproof) dashboard mounted 10" Tablet, Dashcam with video calling feature, body cam, rear & front view varifocal cameras with vandalproof housing (mounted on vehicle), LPU, storage, UPS, live monitoring provision of cameras from TMC & sub-centres, etc. for patrol, ambulance, and maintenance vehicles.	Set	5	419,000	2,095,000	
4.22	<b>Incident Monitoring System (IMS) for PIU office:</b> Workstation (1 nos. at each location), All-in-one color A4 printer, 100" 4K UHD LED display (commercial grade), UPS as per site requirement, Networking devices, switches, CCTV camera, DG of suitable rating as per site requirement, Connectivity with TMC & Sub-centres, etc.	Set	1	2,058,000	2,058,000	
4.23	<b>ATMS Software package at TMC for entire stretch</b>	LS	1	14,928,292	14,928,292	One Time
4.24	Uninterruptible Power Supply (UPS) For Server Rack (10KVA X 1 nos. Online Double Conversion UPS -IGBT based, arranged in parallel configuration -Warranty 5 years) (1 at TMC and 1 at each Sub-centre)	Set	1	296,000	296,000	
	Battery backup -24000 VAH for Each UPS -Warranty 5 years-100AH X 20nos.	Nos.	20			
	Racks Links DC cable	Nos.	1			
4.25	Uninterruptible Power Supply (UPS) For TMC & Sub centre operator consoles (20KVA Online Double Conversion UPS -IGBT based arranged in parallel configuration -Warranty 5 years)	Set	1	481,150	481,150	
	Battery backup -34560 VAH for Each UPS -Warranty 5 years-100AH X 20nos.	Nos.	20			
	Racks Links DC cable	Nos.	1			
4.26	Power Distribution Board (Essential & Critical Supply)	Set	2	106,700	213,400	
4.27	Any other item(s) considered necessary to comply with the Scope of Works					

<b>Sub-Total (ATMS Control Centre)</b>					<b>49,433,299</b>	
5	<b>Vehicle Speed Detection System Equipment (VSDS) (LHS + RHS)</b>		6			
5.1	ANPR camera with IR flasher for 3 lanes (one each for 2 lanes in each direction + shoulder)	Nos.	18	195,000	3,510,000	
5.2	Local Processing Unit (LPU)	Nos.	6	109,200	655,200	
5.3	Speed Detection Radar (upto 90m range) for 3 lanes (one in each direction for 2+1 lanes)	Nos.	6	458,012	2,748,073	
5.4	Vehicle Actuated Speed Display (VASD) System (one each for 2+1 lanes in each direction + shoulder) with Solar	Nos.	18	40,950	737,100	
5.5	Motion Detection surveillance camera, hooter alarm with beacon, and all-in-one solar street light	Set	6	49,140	294,840	
5.6	Gantry (including manufacturing and galvanizing)	Nos.	6	492,000	2,952,000	
5.7	Cabinet	Nos.	6	49,935	299,610	
5.8	Industrial 12-port managed Gigabit Ethernet switch with 3x10/100/1000Base-T(X) and 2xGigabit combo ports, SFP socket	Nos.	6	75,000	450,000	
5.9	Solar System with UPS, Li-on battery, Pole, cabinet for VSDS, with SPD, and lighting protection	Set	6	280,572	1,683,432	
5.10	Any other item(s) considered necessary to comply with the Scope of Works					
	<b>Total (VSDS) INR</b>				<b>13,330,254</b>	
<b>Total (ATMS Component)</b>					<b>132,313,138</b>	
6	<b>Services</b>					
6.1	Installation, Testing & Commissioning	LS	1	2,646,263	2,646,263	
6.2	ATMS System Technical support staff (without escalation) (Base Yr. 2021)	Years	22	6,163,200		Yearly O&M cost to be paid quarterly from date of Go-live
6.3	ATMS Control Room Operations staff (without escalation) (Base Yr. 2021)	Years	22	12,413,070		
6.4	Spares	Years	22	529,253		
<b>Sub-Total (Services)</b>					<b>2,646,263</b>	
<b>ATMS Grand Total (Covered in EPC (civil) Contractor's scope)</b>					<b>134,959,401</b>	

**Items not include in this cost**

1	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.				
	6.5 lac /kms	kms	75	650,000	48,750,000
2	As per NHAI Policy for ATMS -2016 Chapter 14 ATMS Control Centre with ATMS Software				
	The Control Centre shall accommodate following equipment and software:(i) Central Computer Server (with integrated ATMS Software including the trafficManagement and Rescue module, integrated audio communication unit &support for relevant Mobile smartphone applications)(ii) Emergency call management system equipment and software(iii) Integrated Traffic Management (ITM) console consisting of mainly the ITMWorkstation, the Integrated audio communication unit and further integratedwith the1. Large Display Board based on the Video-wall2. CCTV Console,3. VIDS console and4. other equipment(iv) ATMS software(v) Mobile radio operator and configuration equipment and software(vi) Backbone communication equipment and Network Management System forthe same(vii) Printer(viii) Uninterrupted Power Supply with supply system and back up(ix) Mains Power supply system and Diesel Generator set equipment.				

Consider area of Control Center is (40X80 =3200 Sqft) rate includes following items:-Civil Works Power Connections Electrical accessories ect.Sitting space arrangements (Furnitures)False ceiling if requiredFire detection and alarm systems	Sqft	3200	2500	8,000,000
<b>Total</b>				<b>56,750,000</b>
<b>Grand Total</b>				<b>191,709,401</b>

TMS - Price Schedule for a Toll Plaza with 14 lanes					
Number of Lanes at Toll Plaza:		14			
<b>Part I - System Supply, Installation, Integration and Commissioning</b>					
Sl. no	Item	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
<b>A</b>	<b>Integral Components (Lane level &amp; Plaza Level )</b>				
1	RFID ETC transceiver near Pay-axis - mounted on canopy (1 per lane)	No	14	77,800.00	1,089,200.00
2	Electronics Enclosure - (1 per lane)	No	14	6,670.00	93,380.00
3	Lane Controller with Industrial PC - (1 per lane)	No	14	91,895.00	1,286,530.00
4	AVC including sensors, loop and detector - (1 per lane)	Set	14	150,000.00	2,100,000.00
5	User Fare Display with mounting pole - (1 per lane)	Set	14	14,300.00	200,200.00
6	Automatic Barrier Gate - (1 per lane)	No	14	78,000.00	1,092,000.00
7	Overhead Lane Status light (OHLS) - (1 per lane)	No	14	8,250.00	115,500.00
8	Traffic light with mounting pole - (1 per lane)	Set	14	8,250.00	115,500.00
9	Loops with detector - (2 per lane)	Set	28	4,050.00	113,400.00
10	Incident Capture Camera with mounting pole - (1 per lane)	Set	14	6,400.00	89,600.00
11	License Plate Image Capture Camera with mounting poles - (1 per lane)	Set	14	6,400.00	89,600.00
12	Customized industrial grade keyboard - (1 per lane)	No	14	6,630.00	92,820.00
13	Cabling/Networking/Installation/Commissioning (Lump sum)	LS	1	688,000.00	688,000.00
14	Software – Lane Level - (1 per lane)	No	14	15,000.00	210,000.00
15	Plaza Servers in hot-standby configuration	No	1	565,000.00	565,000.00
16	Workstations for MIS, Cashup, Audit & LSDU (Lane status display unit in control room)	No	4	42,500.00	170,000.00
17	24 Port Network switch (Layer 3)	No	2	70,000.00	140,000.00
18	Outdoor wifi Access Point	No	1	9,250.00	9,250.00

19	Software – Plaza level	Job	1	100,000.00	100,000.00
20	Broadband/Dedicated Internet Lease Line ( 01 Static IP) with minimum 04 Mbps link for CCH connectivity	Facility	2	80,000.00	160,000.00
21	UPS system as required for complete Hybrid ETC Toll Plaza system	No	2	205,000.00	410,000.00
22	Servo stablizer (60 KVA - 03 phase)	No	1	105,000.00	105,000.00
23	Network Video Recorder (NVR) for CCTV recording with adequate storage	No	1	62,000.00	62,000.00
<b>B</b>	<b>Other components (Lane level &amp; Plaza Level)</b>				
24	TFT Monitor - (1 per lane)	No	14	5,350.00	74,900.00
25	Thermal Receipt Printer - (1 per lane)	No	14	12,500.00	175,000.00
26	RFID Handheld Readers	No	4	68,000.00	272,000.00
27	Violation light & Alarm (on existing pole) and Foot switch in booth - (1 per lane)	No	14	2,400.00	33,600.00
28	Booth CCTV camera with voice recording - (1 per lane)	No	14	7,950.00	111,300.00
29	Intercom Slave unit in booth - (1 per lane)	No	14	3,750.00	52,500.00
30	Lane Level UPS - (1 per lane)	No	14	16,000.00	224,000.00
31	Intercom Master unit - (1 per plaza)	No	1	44,000.00	44,000.00
32	Firewall Hardware	No	1	42,000.00	42,000.00
33	CCTV cameras for Plaza building surveillance (server room, control room, cash room, admin)	No	4	5,250.00	21,000.00
				<b>Total CAPEX Price (A)</b>	10,147,280.00

**Part II– Operation & Maintenance (2 years)**

Sl. no	Item	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
34	Quarterly O&M charges	Quarter	8	120,000.00	960,000.00
				<b>Total OPEX Price (B)</b>	960,000.00

	Total Price for Toll Plaza (A + B) in Rs.	11,107,280.00
	No. of Toll Plaza - 1 =	12,440,153.60
	No. of Toll Plaza - 2 =	24,880,307.20
	No. of Toll Plaza - 3 =	37,320,460.80



# NATIONAL HIGHWAY AUTHORITY OF INDIA

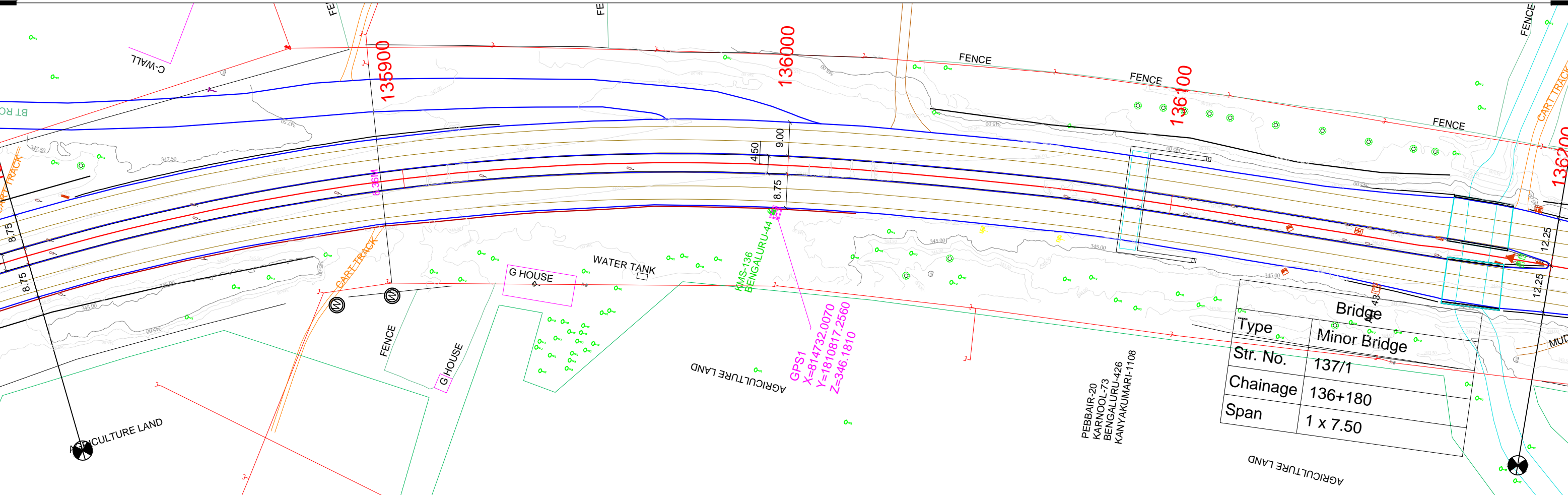
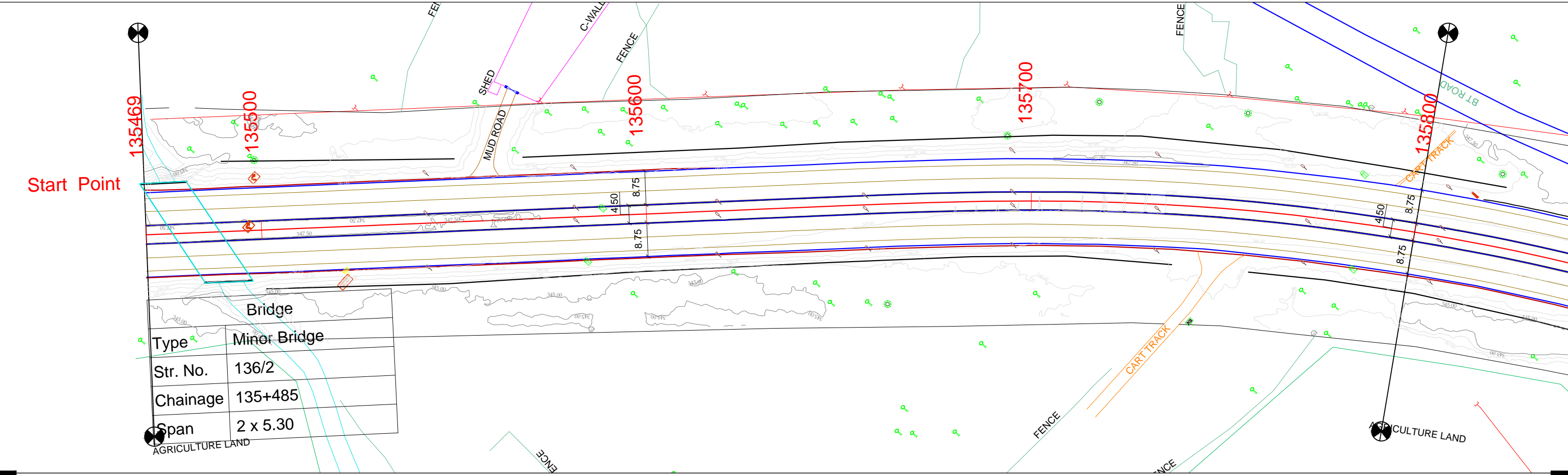


**PROJECT:- PREPARATION OF REPORT ON PHYSICAL CONDITION OF THE NATIONAL HIGHWAY  
ON ROADS UNDER (InvIT) MODEL**

## TOPOGRAPHICAL SURVEY MAP KOTHAKOTA BYPASS - KURNOOL

Consultant:-  
TECNICA Y PROYECTOS, S.A. (TYP SA) in JV  
AVANZA Engineering Pvt. Ltd.





REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

DRAWN BY  
DESIGN BY  
CHECKED BY  
APPROVED BY

CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**



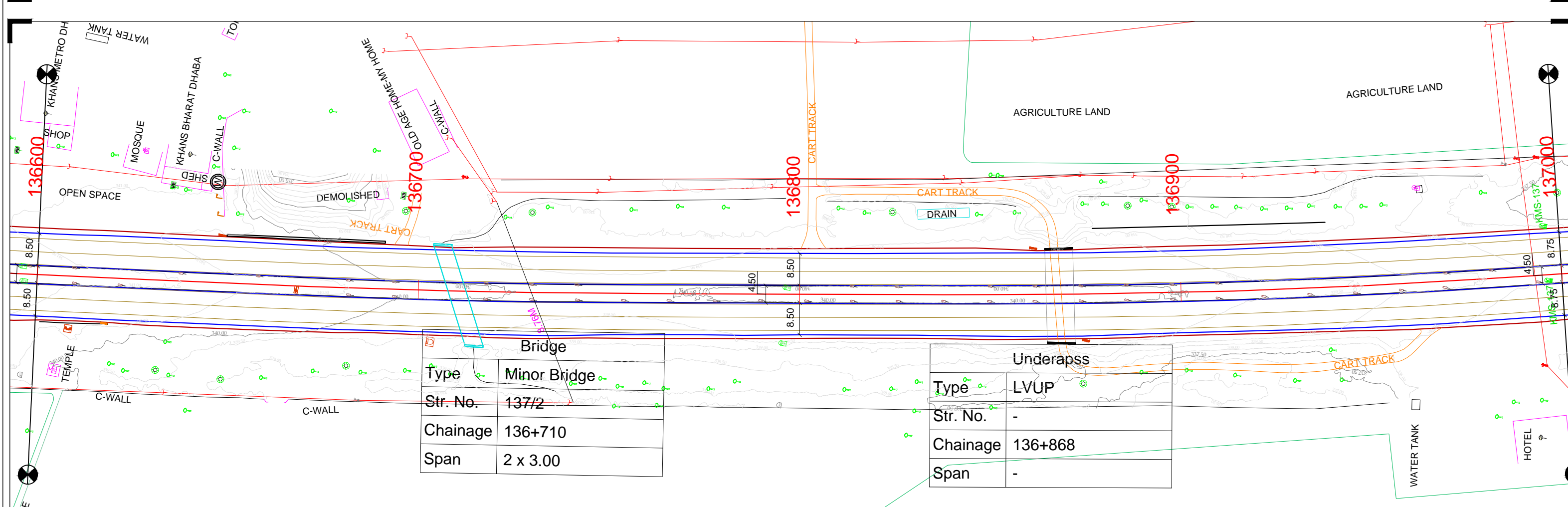
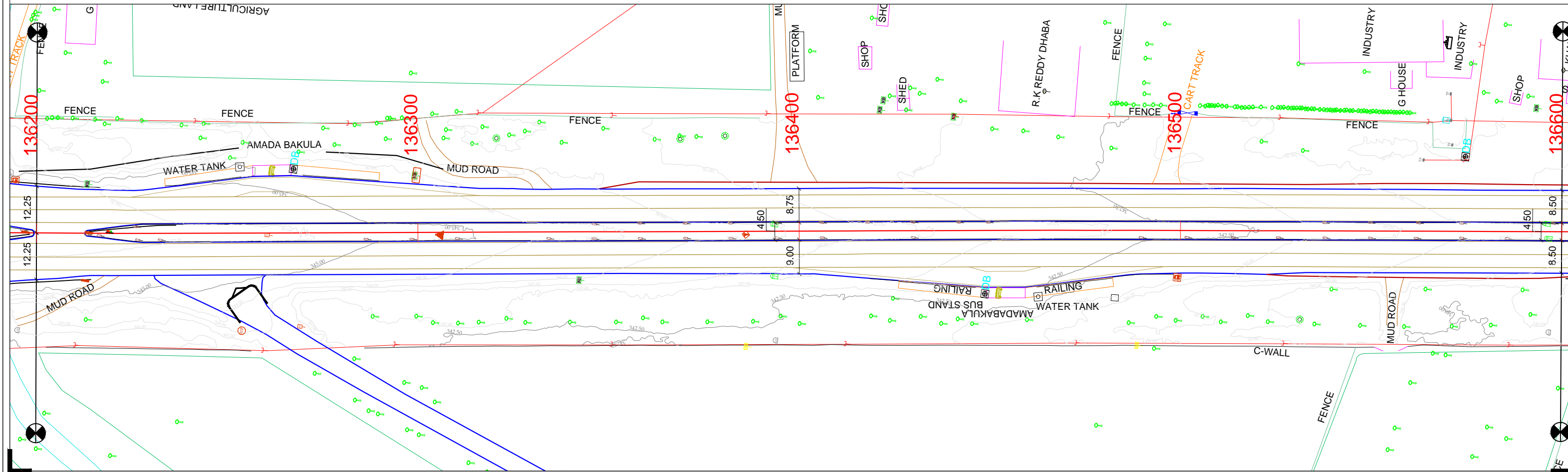
PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 135/469 TO 136/200			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
01	1 : 1000	A3	0

<<< TO KOTHAKOTA



(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>

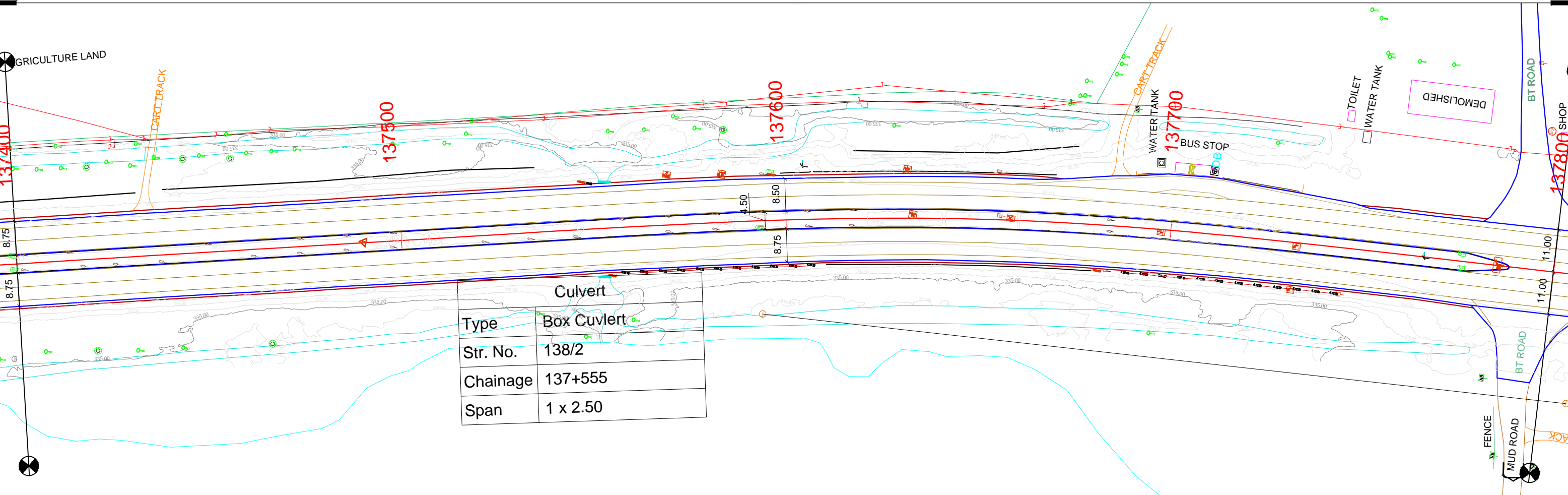
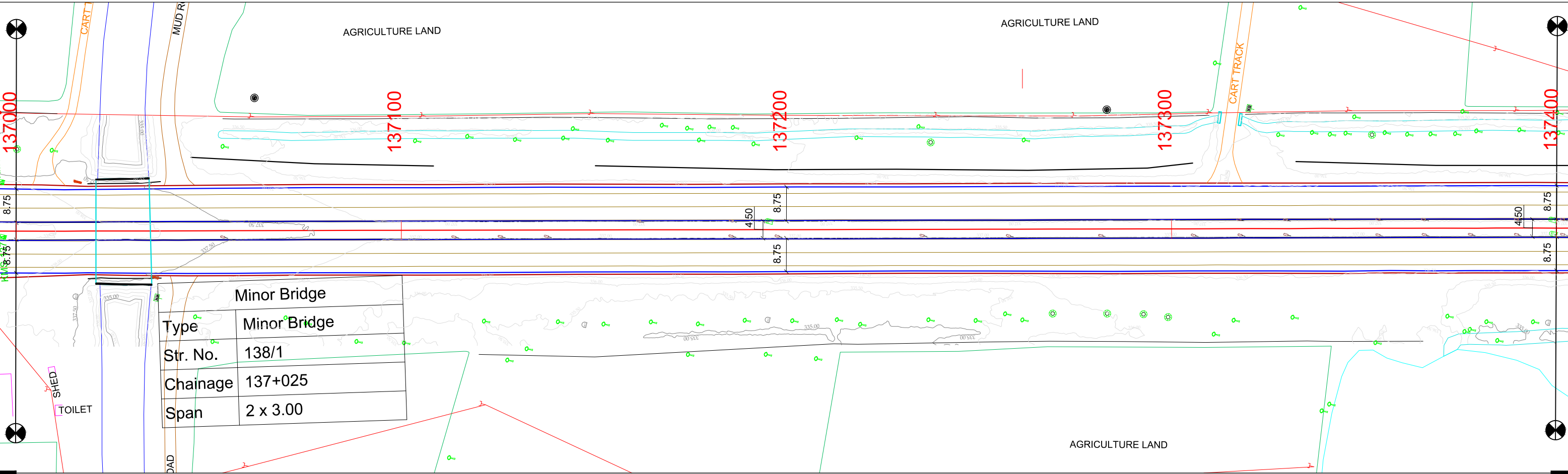


Bridge	
Type	Minor Bridge
Str. No.	137/2
Chainage	136+710
Span	2 x 3.00

Underapss	
Type	LVUP
Str. No.	-
Chainage	136+868
Span	-

			CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA		DRAWN BY DESIGN BY CHECKED BY APPROVED BY		CONSULTANT:- TYPESA in JV with AVANZA Engineering Pvt. Ltd. 		PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model		TITLE:- KMS 136/200 TO 137/000			
											DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS									SHEET NO.	SCALE	SIZE	REV
											02	1 : 1000	A3	0





REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

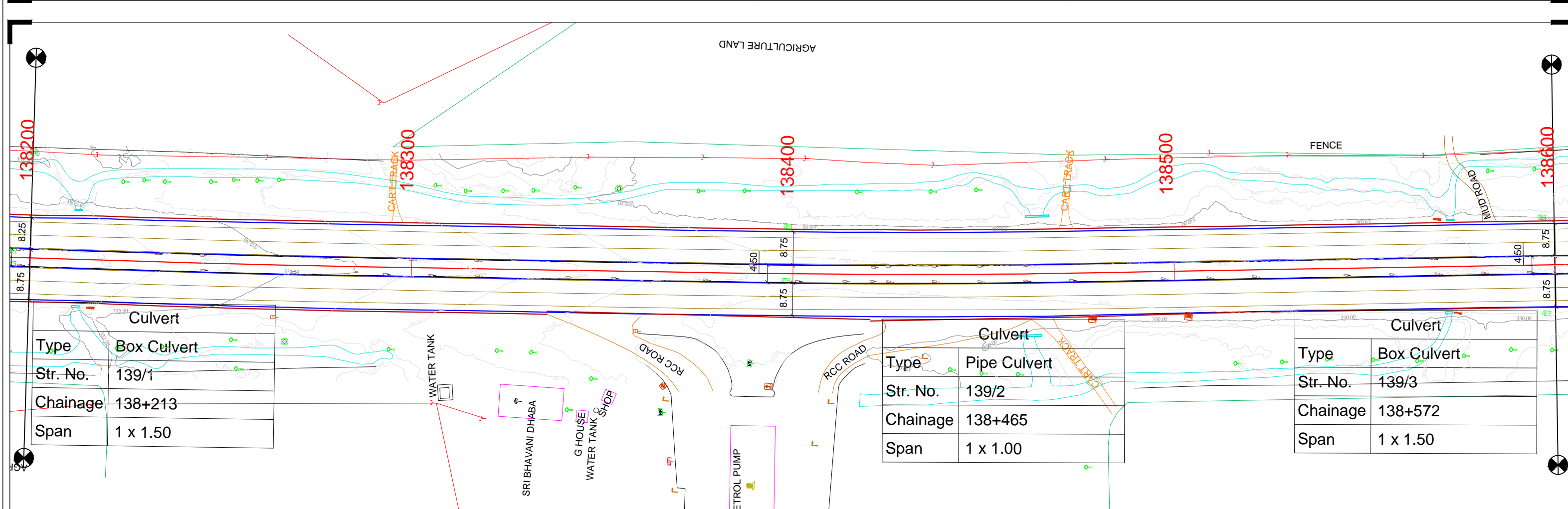
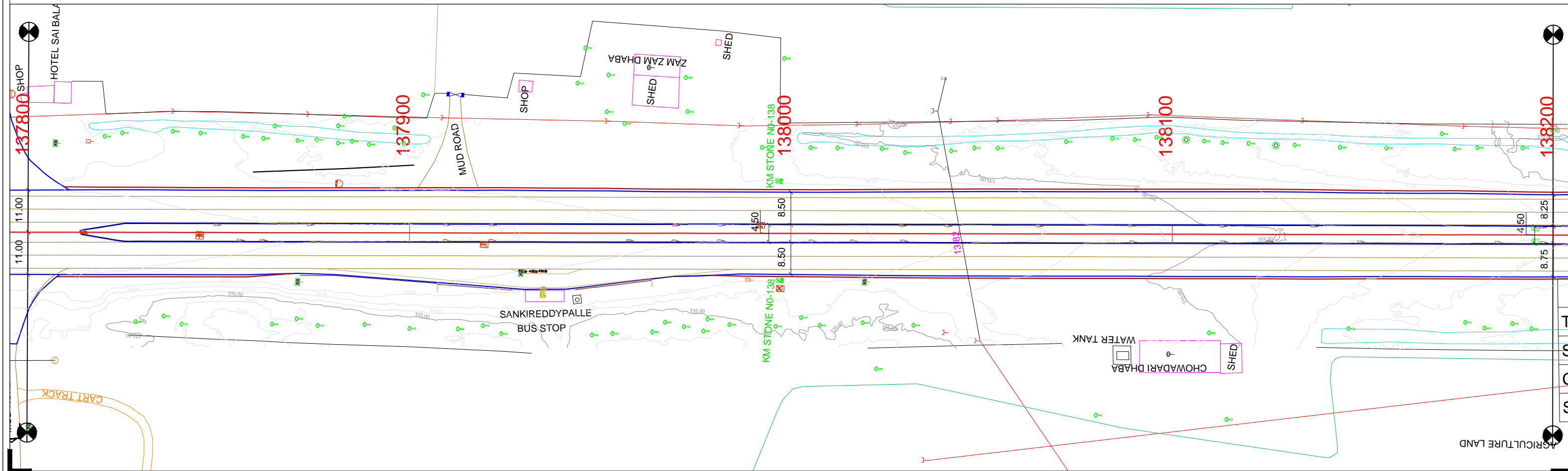
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.




  


PROJECT :-

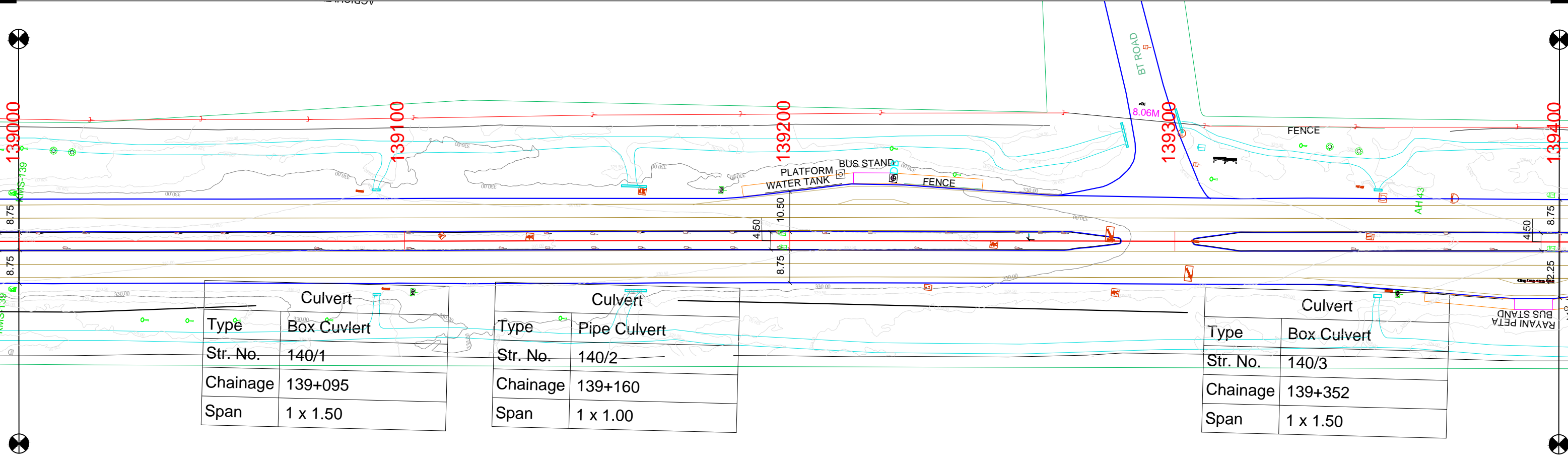
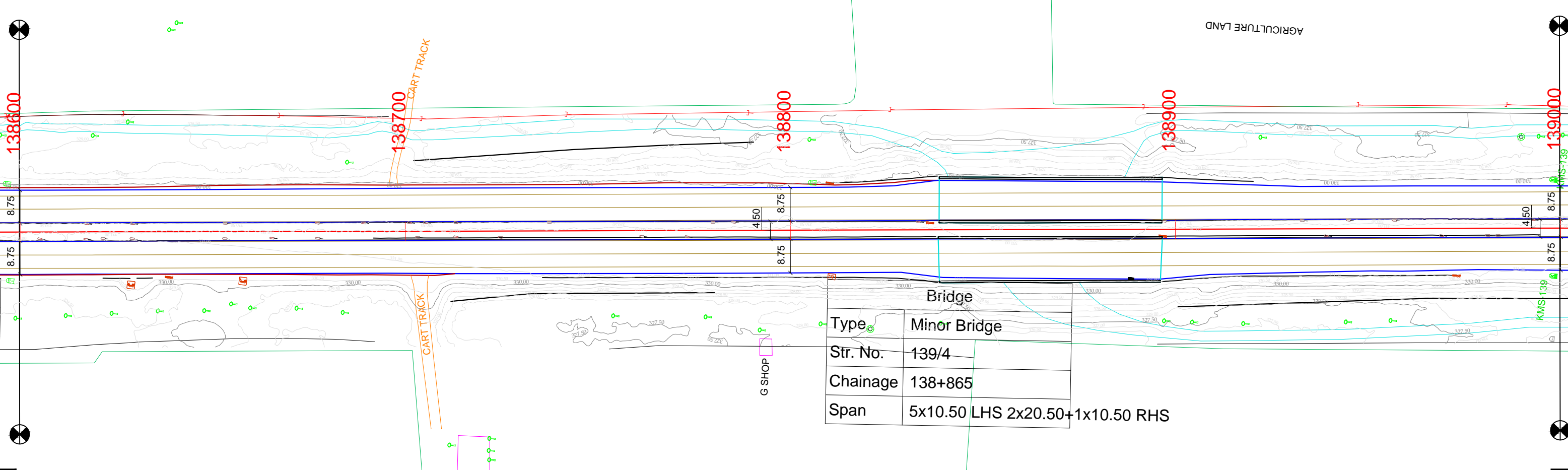
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 137/000 TO 137/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
03	1 : 1000	A3	0



			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 137/800 TO 138/600				
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S				
REV	DATE	DESCRIPTION OF REVISIONS			APPROVED BY							







REV	DATE	DESCRIPTION OF REVISIONS

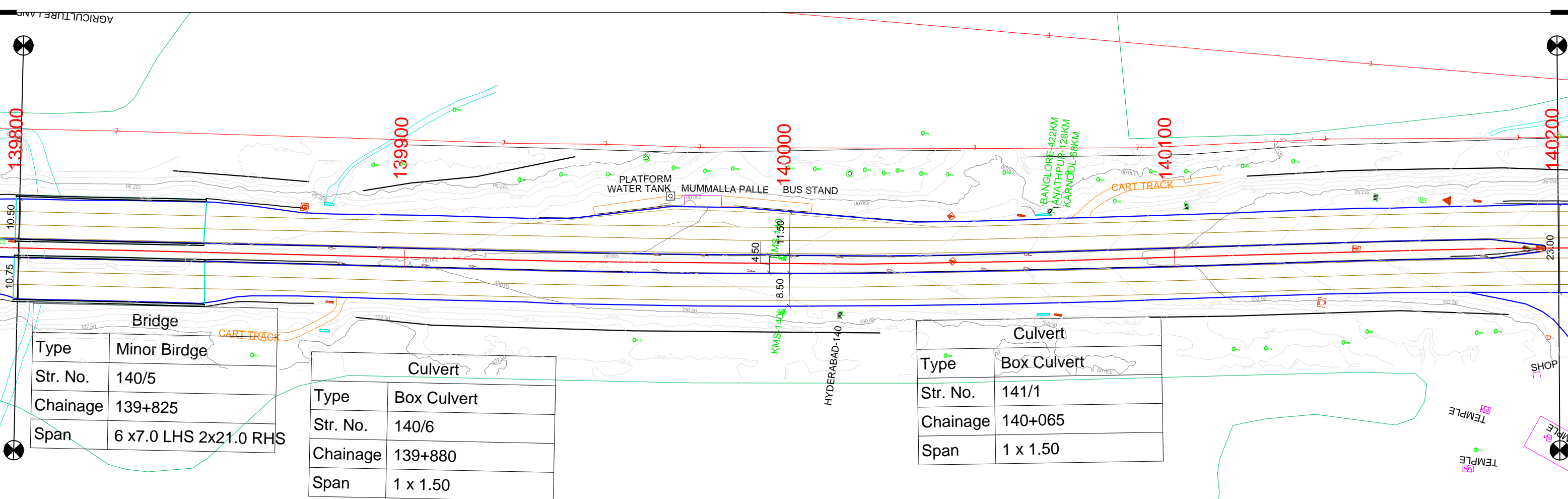
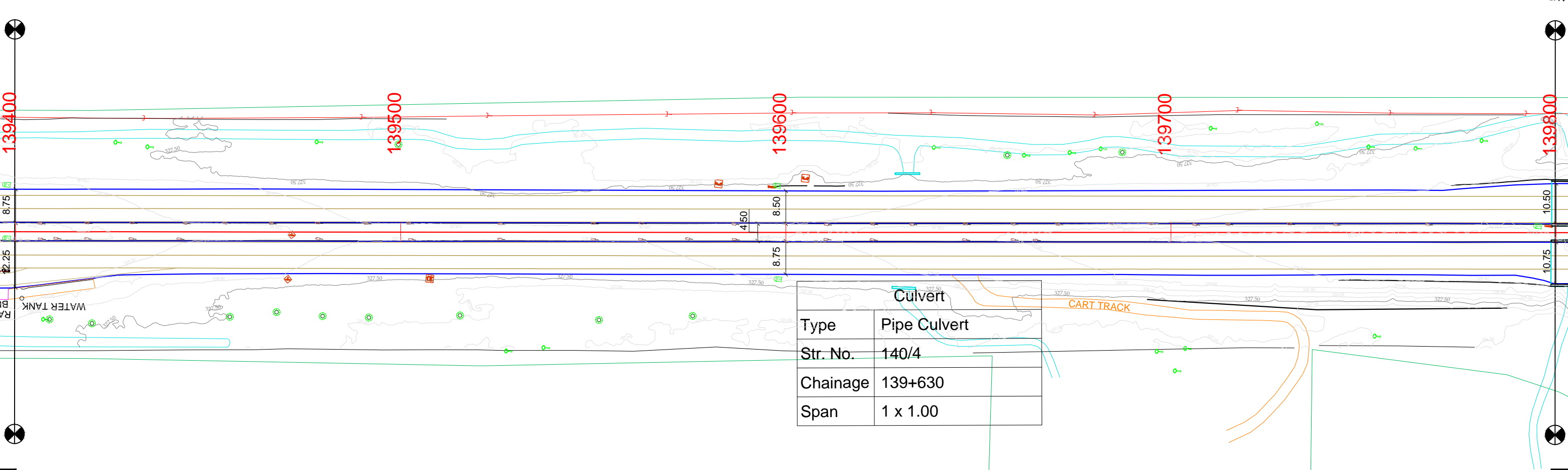
CLIENT :-  
  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

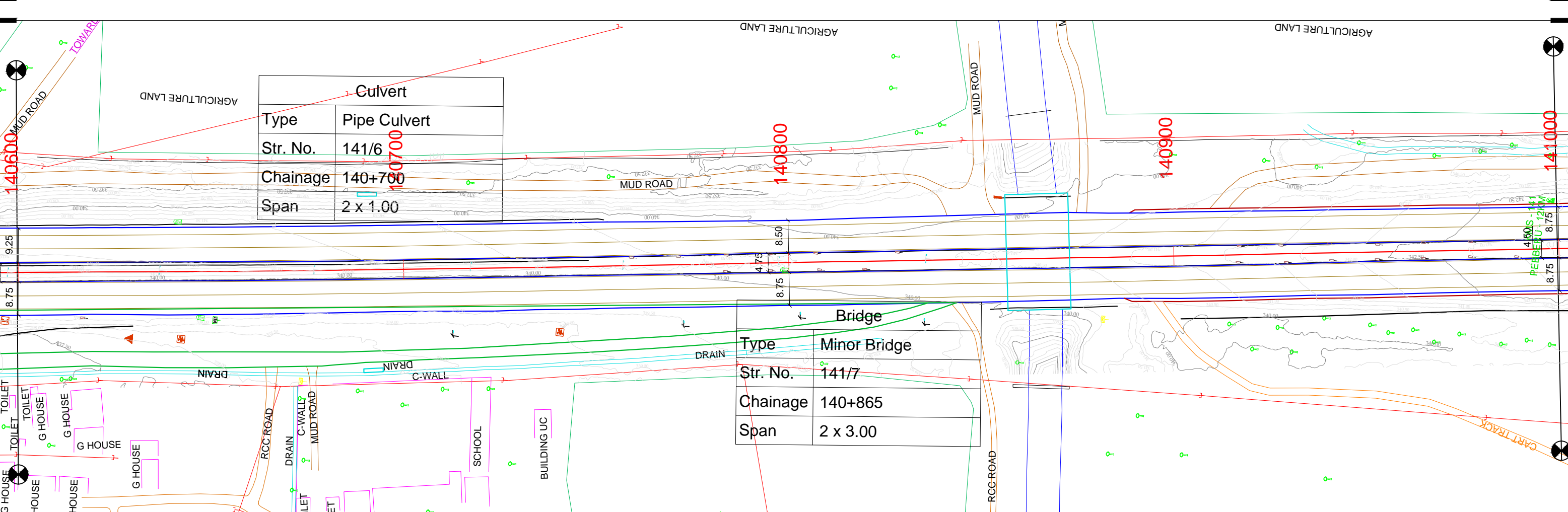
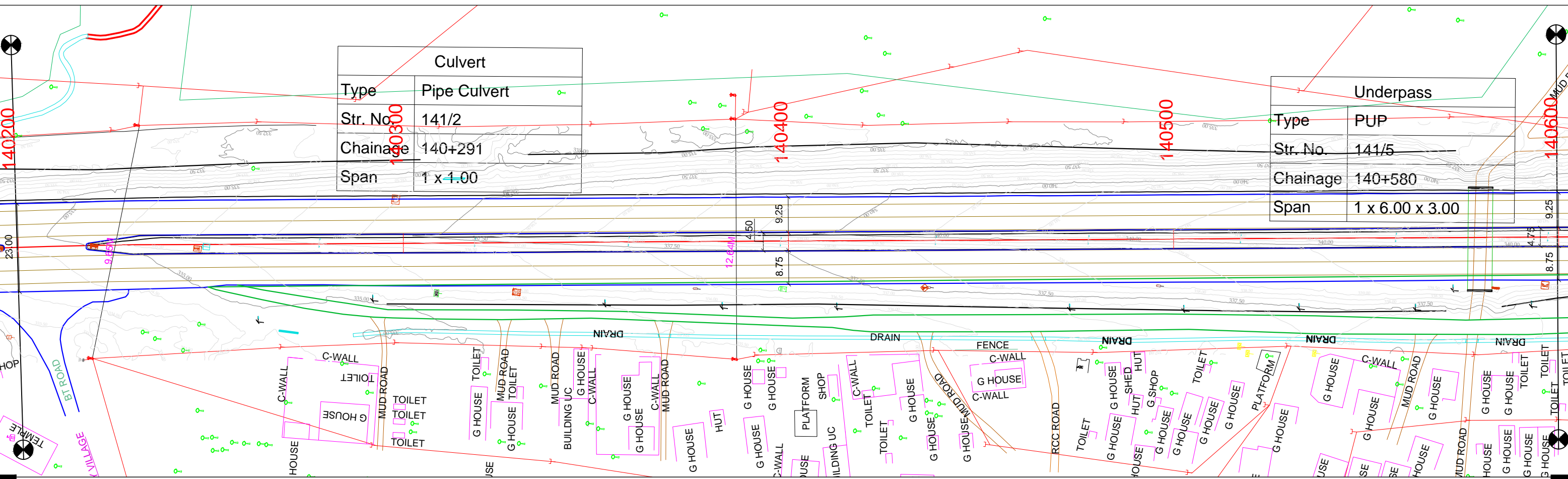
CONSULTANT:-  
TYPISA in JV with  
AVANZA Engineering Pvt. Ltd.  
  





PROJECT :-  
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

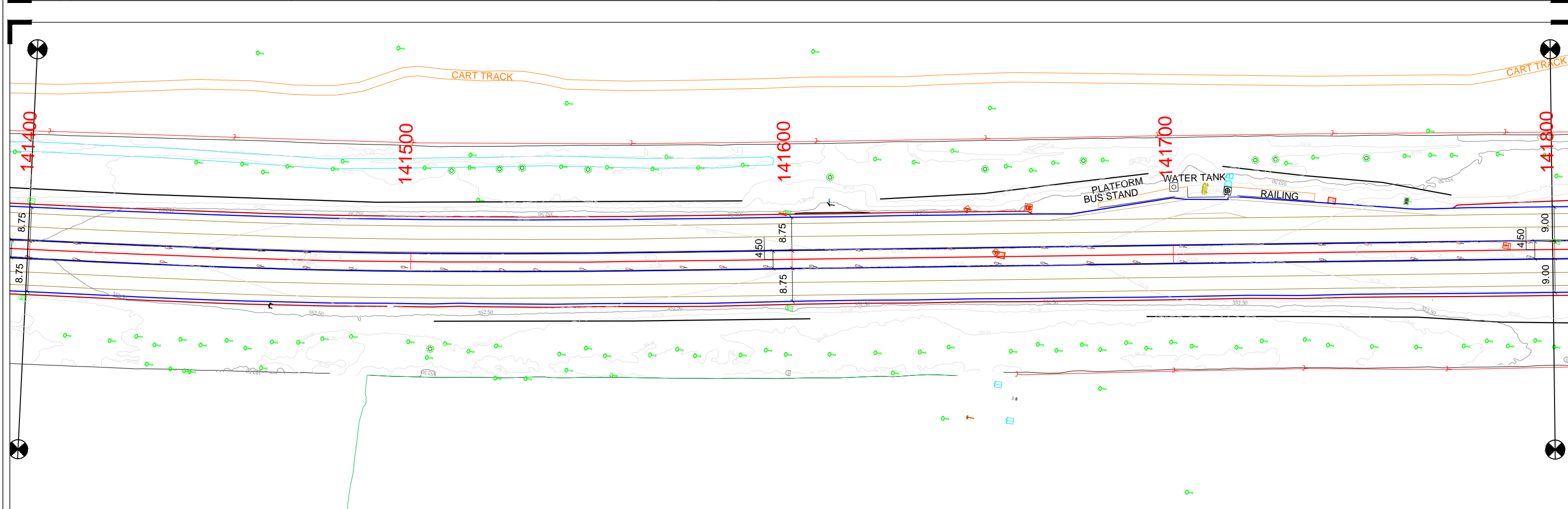
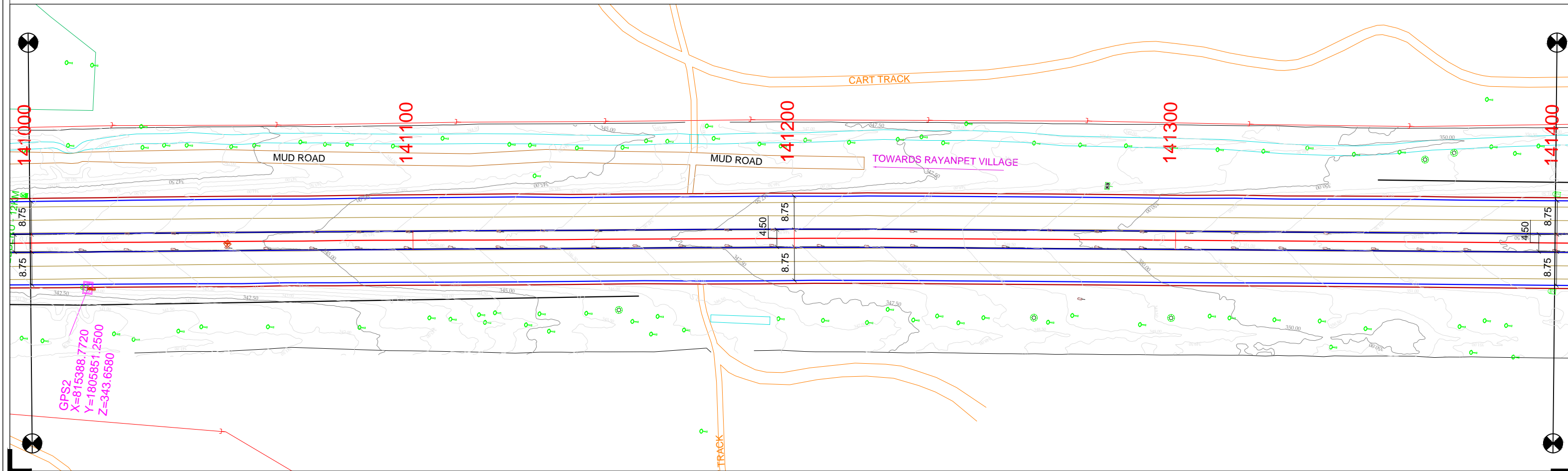
TITLE:- KMS 138/600 TO 139/400			
DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
05	1 : 1000	A3	0







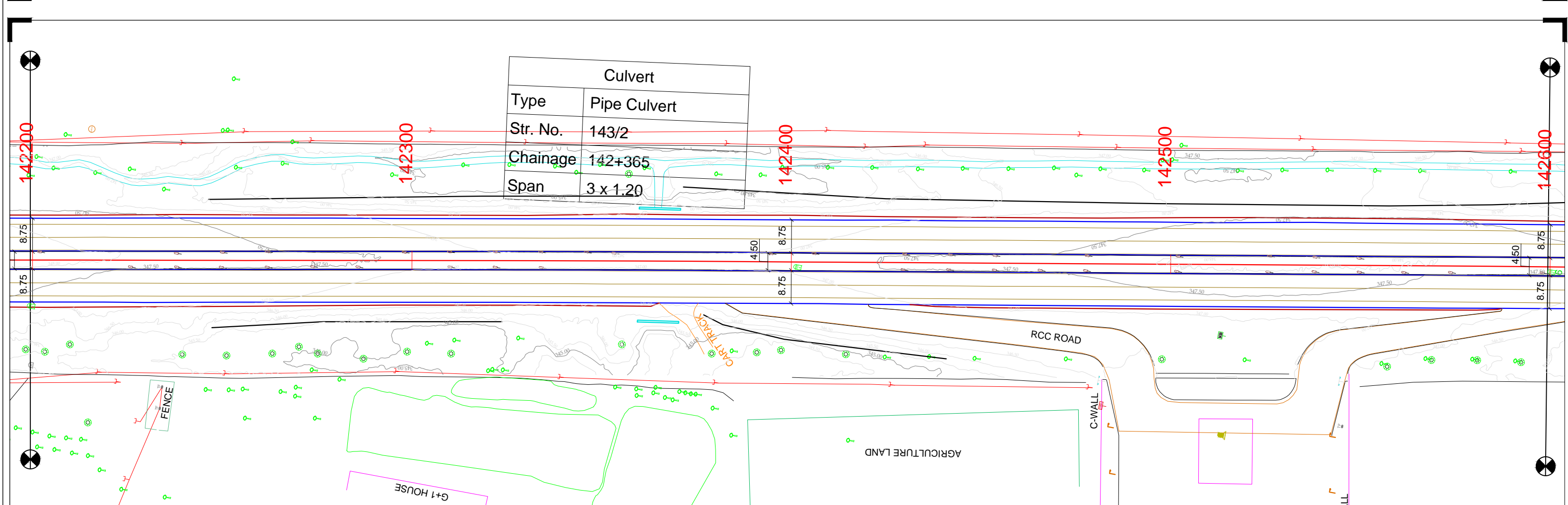
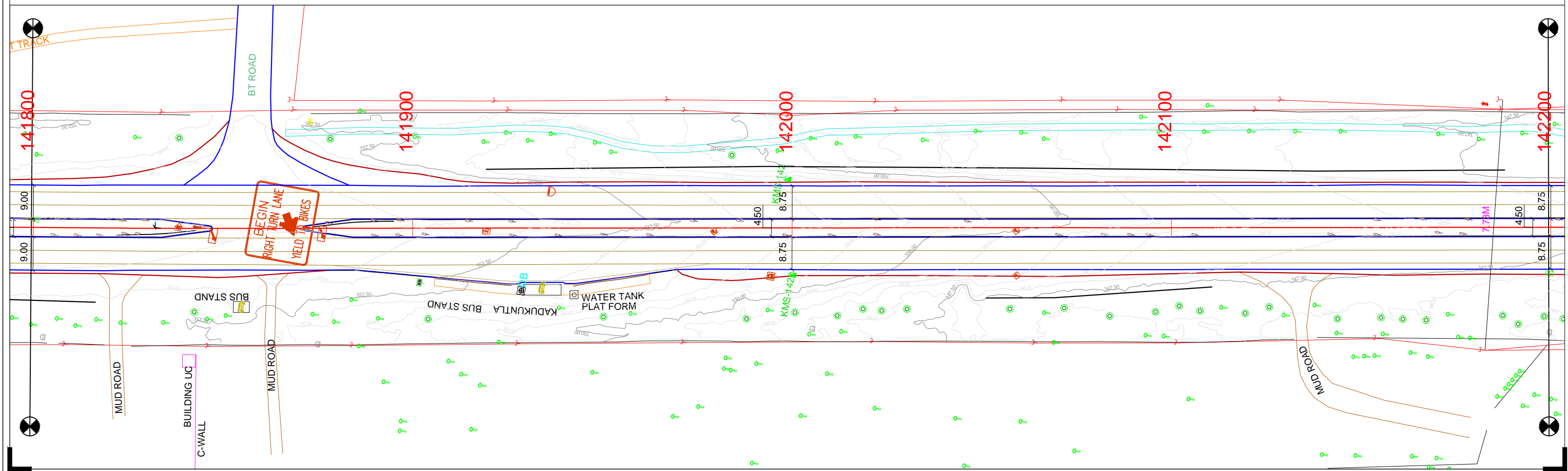





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 140/200 TO 141/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				07 1 : 1000 A3 0			



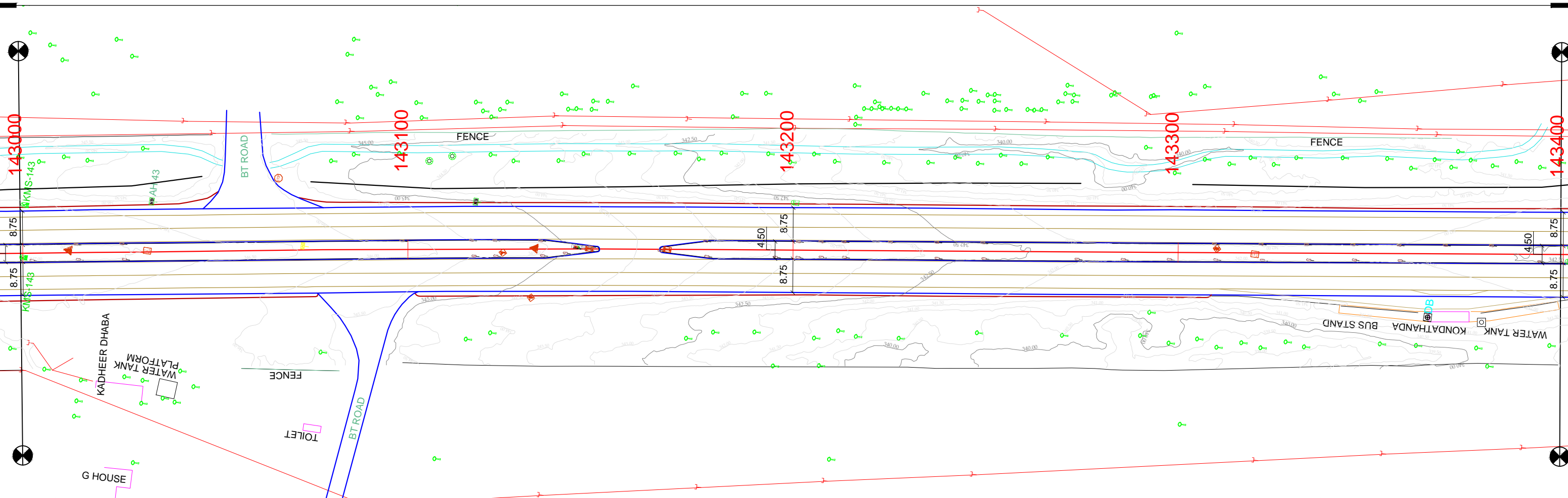
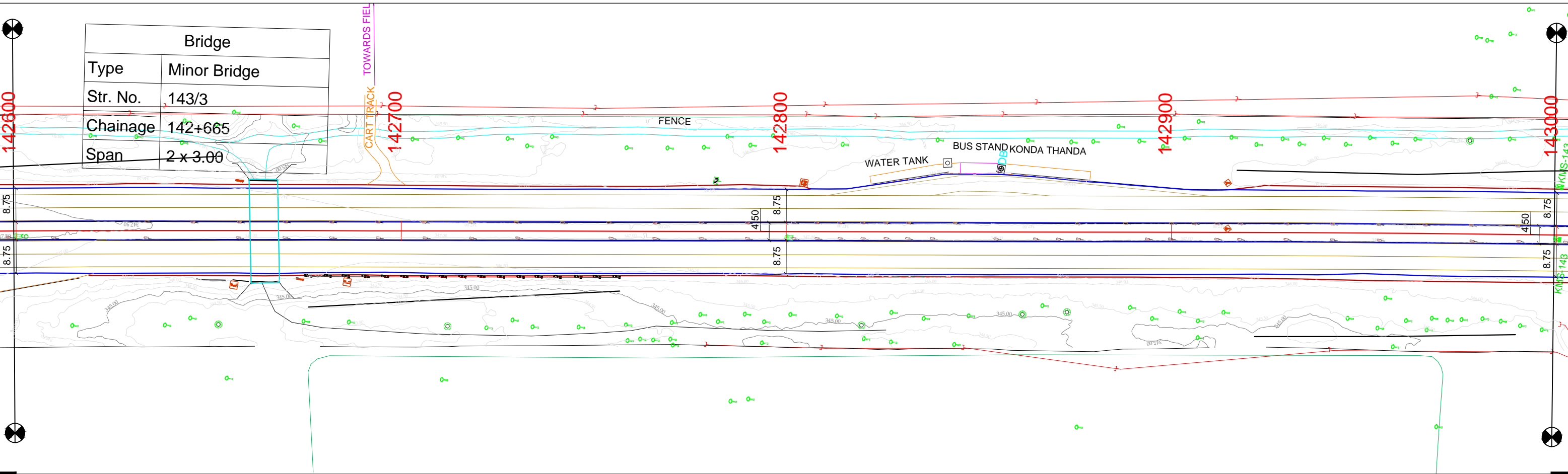
			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 141/000 TO 141/800			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
				APPROVED BY				08 1 : 1000 A3 0			
REV	DATE	DESCRIPTION OF REVISIONS									





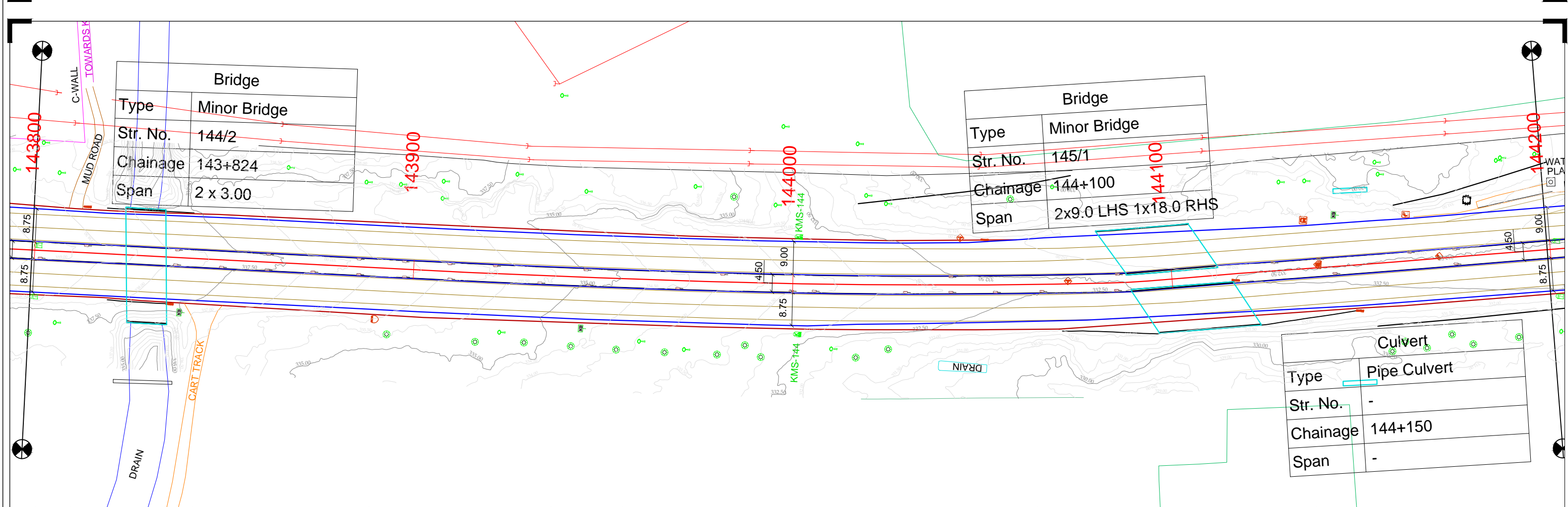
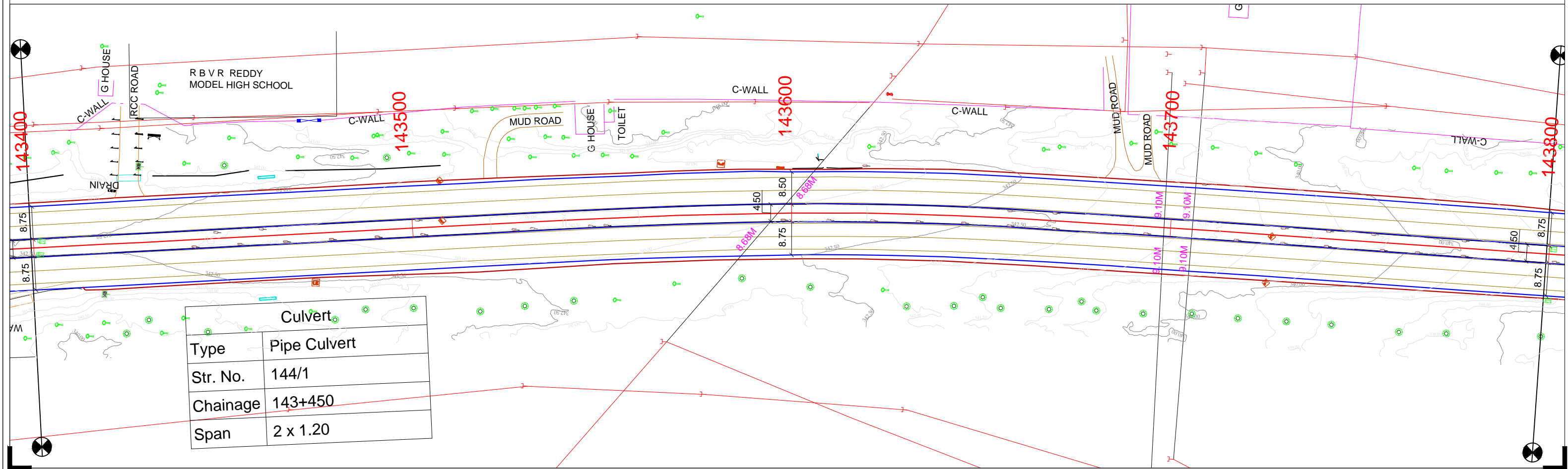





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd.  </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 141/800 TO 142/600			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				09 1 : 1000 A3 0			



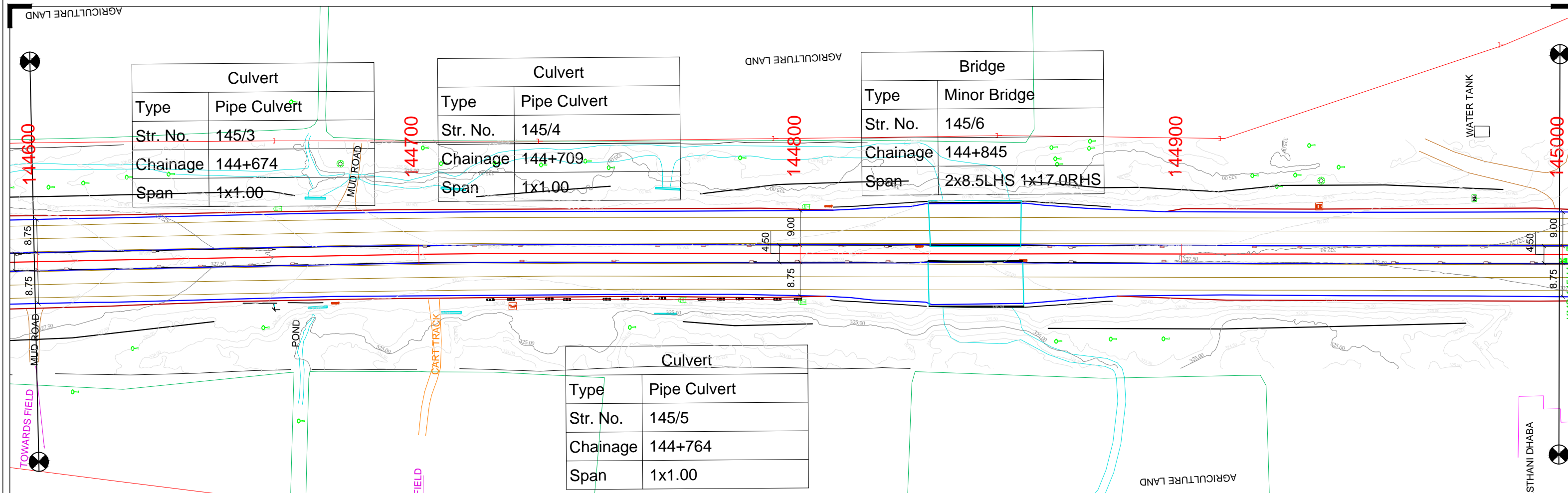
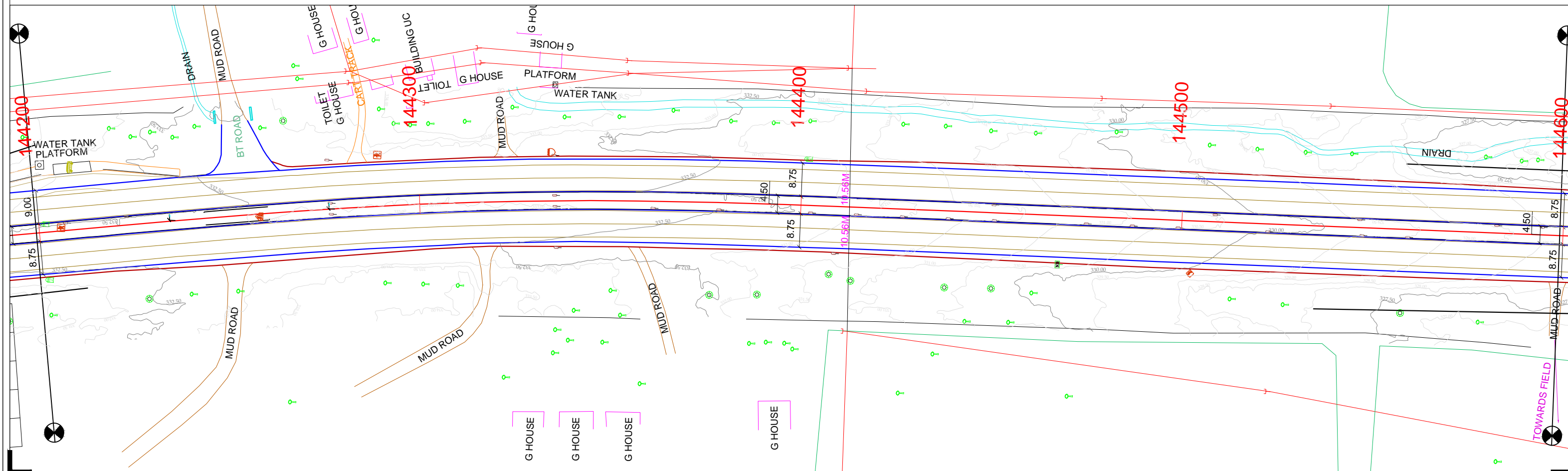


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 142/600 TO 143/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				6347	10 1 : 1000 A3 0		



			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 143/ 400 TO 144/ 200			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY							
				APPROVED BY							
REV	DATE	DESCRIPTION OF REVISIONS									



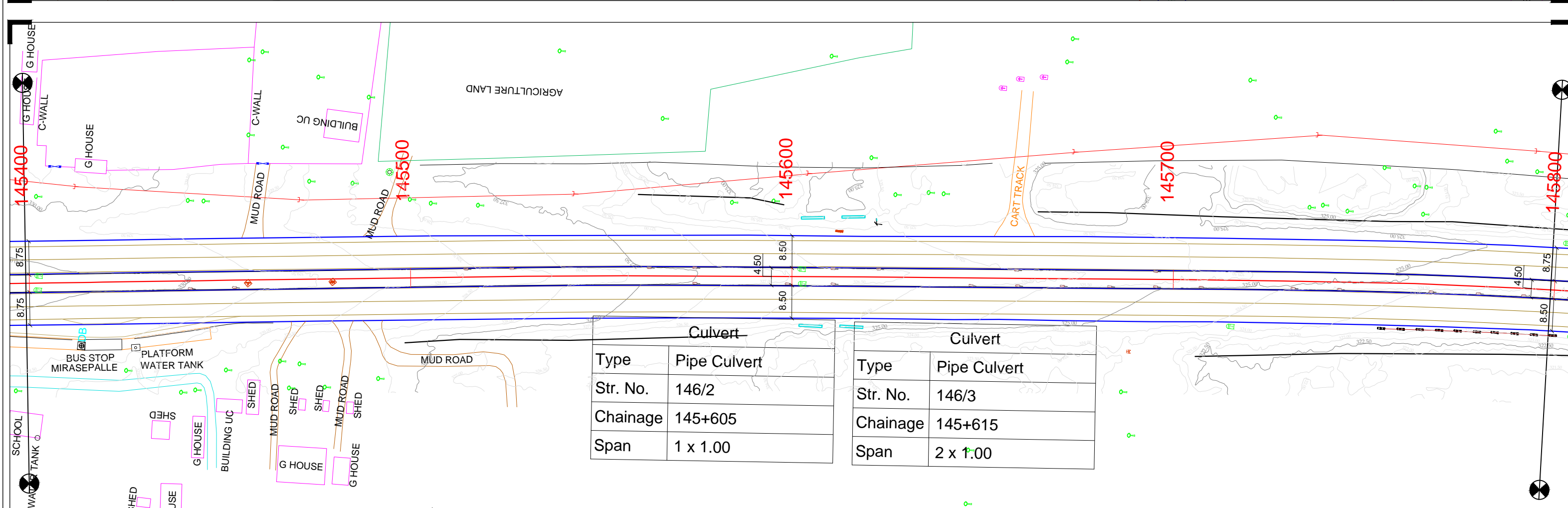
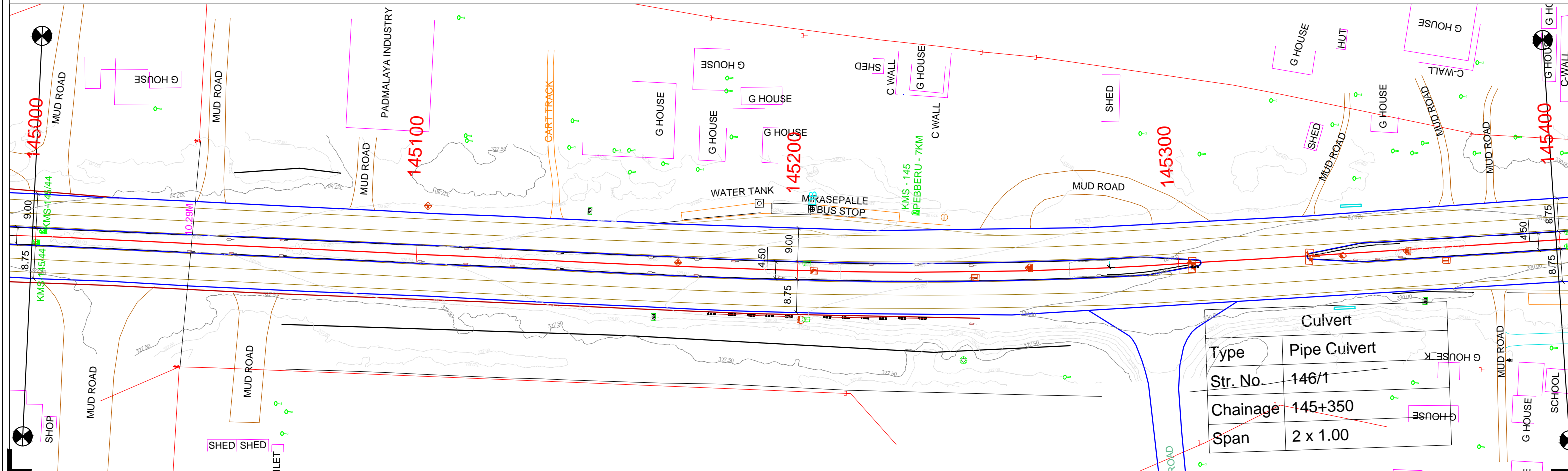





Culvert	
Type	Pipe Culvert
Str. No.	145/3
Chainage	144+674
Span	1x1.00

Culvert	
Type	Pipe Culvert
Str. No.	145/4
Chainage	144+709
Span	1x1.00

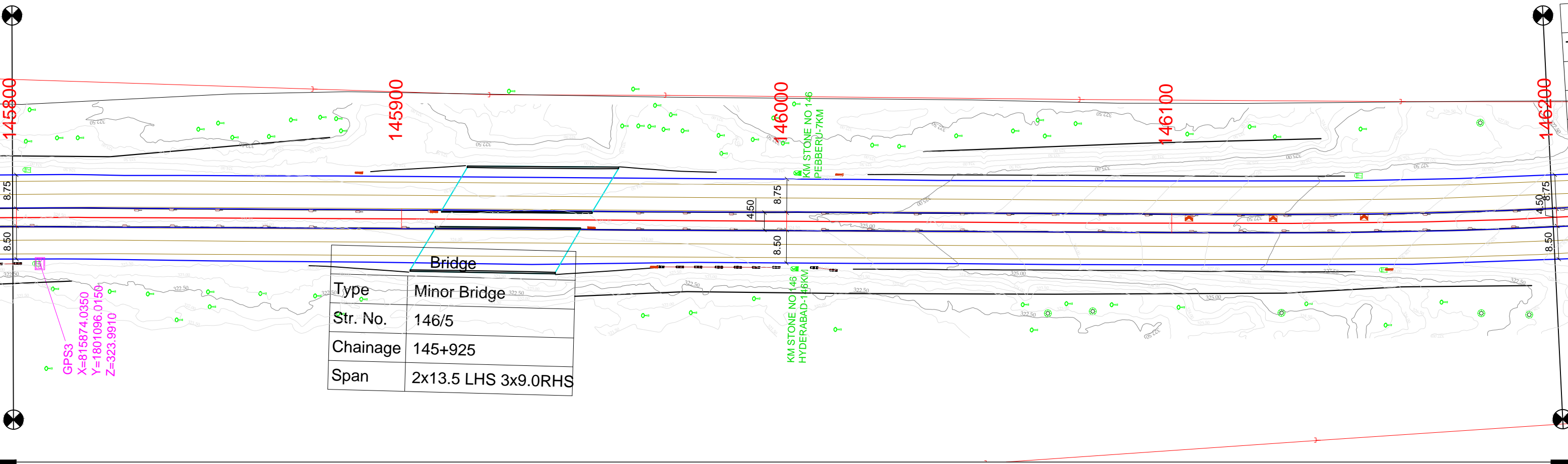
Bridge	
Type	Minor Bridge
Str. No.	145/6
Chainage	144+845
Span	2x8.5LHS 1x17.0RHS

Culvert	
Type	Pipe Culvert
Str. No.	145/5
Chainage	144+764
Span	1x1.00

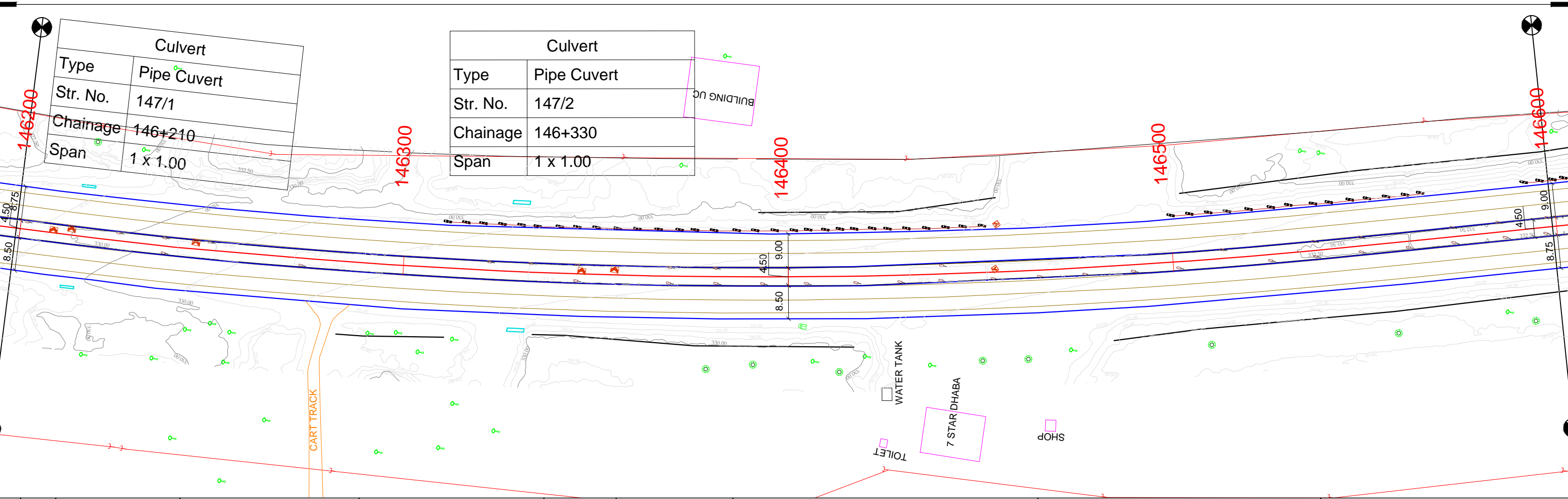


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 145/000 TO 145/800			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE	SIZE	REV	
REV	DATE	DESCRIPTION OF REVISIONS						13	1 : 1000	A3	0





Bridge	
Type	Minor Bridge
Str. No.	146/5
Chainage	145+925
Span	2x13.5 LHS 3x9.0RHS



Culvert	
Type	Pipe Cuvert
Str. No.	147/1
Chainage	146+210
Span	1 x 1.00

Culvert	
Type	Pipe Cuvert
Str. No.	147/2
Chainage	146+330
Span	1 x 1.00

REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-





NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.



PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

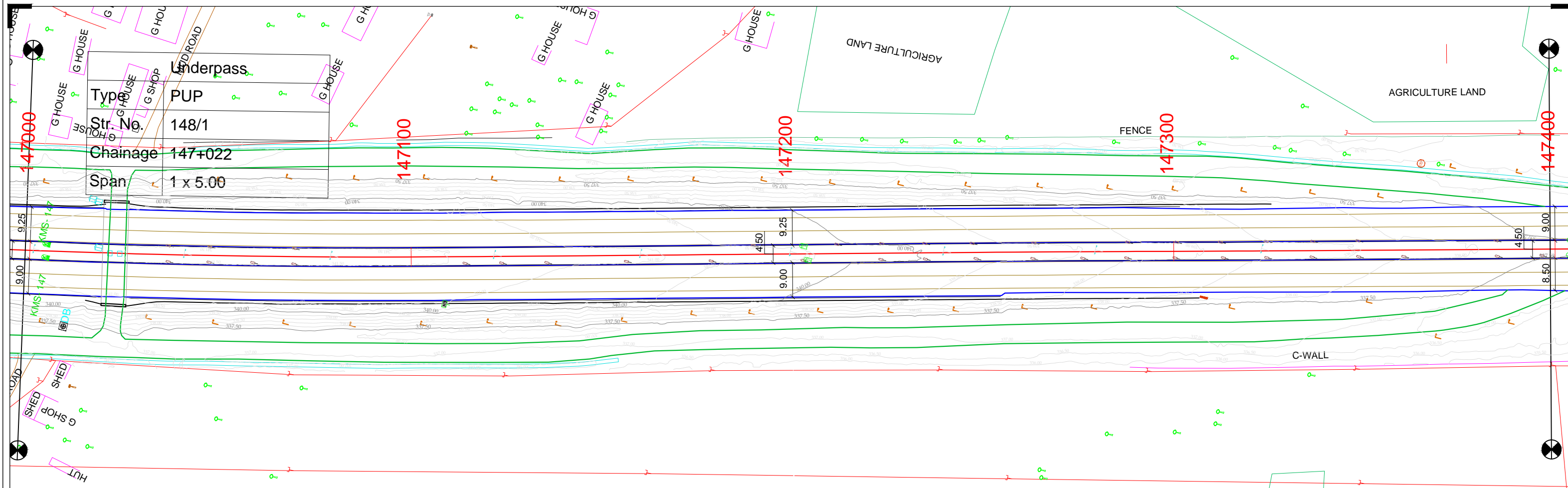
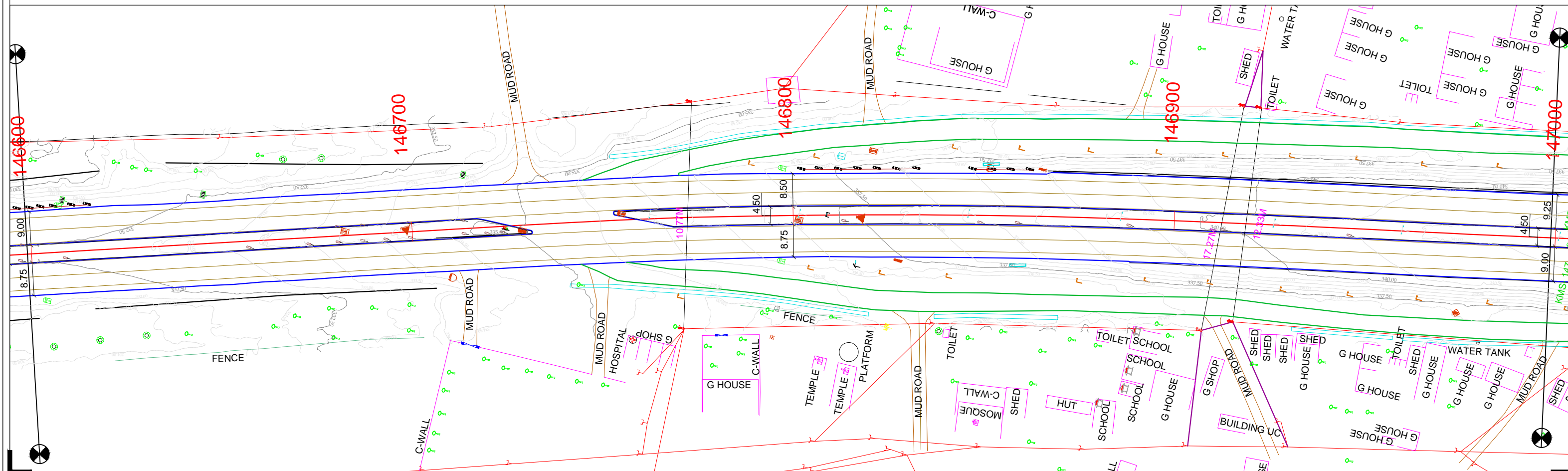
TITLE:- KMS 145/800 TO 146/600			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
14	1 : 1000	A3	0






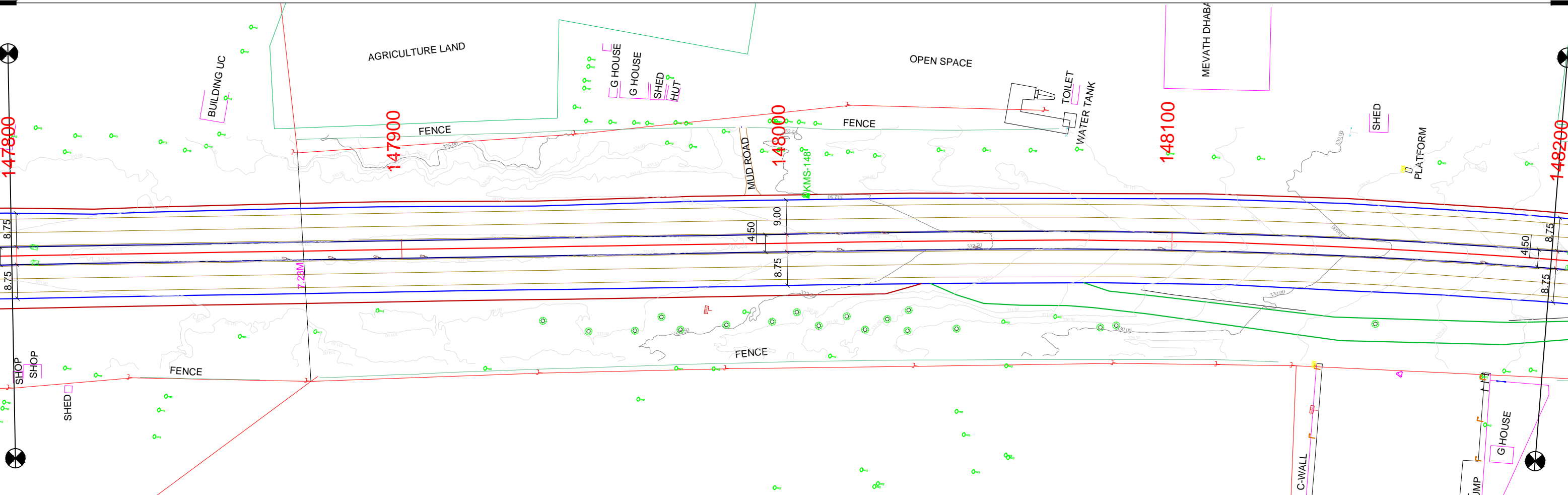
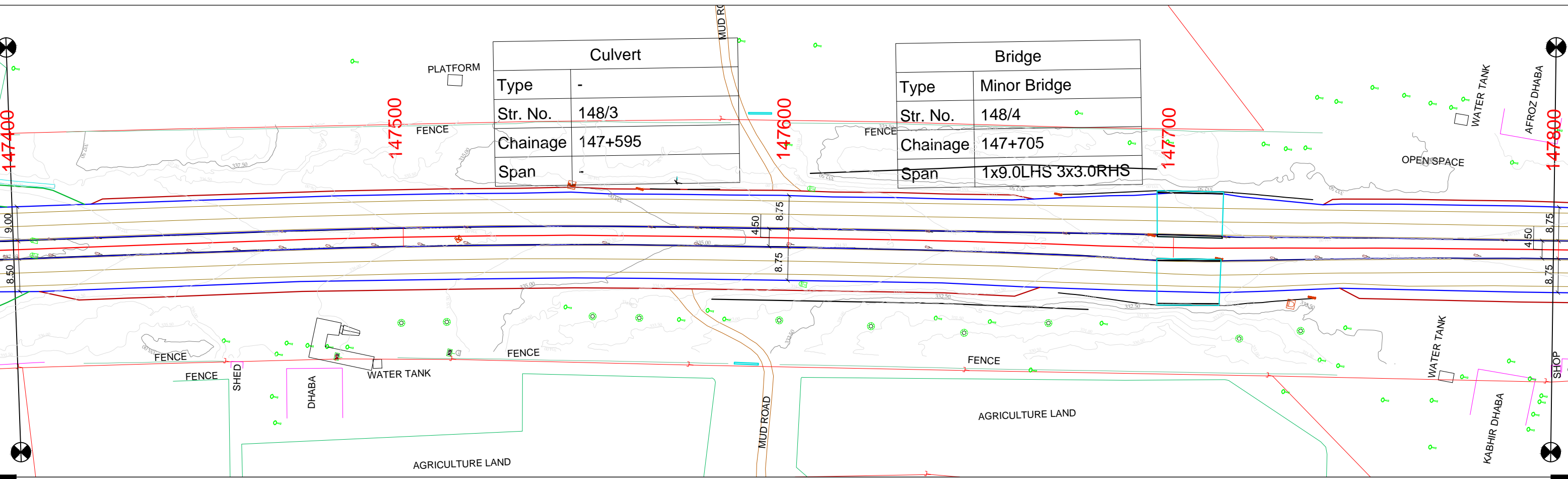
<<< TO KOTHAKOTA



(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

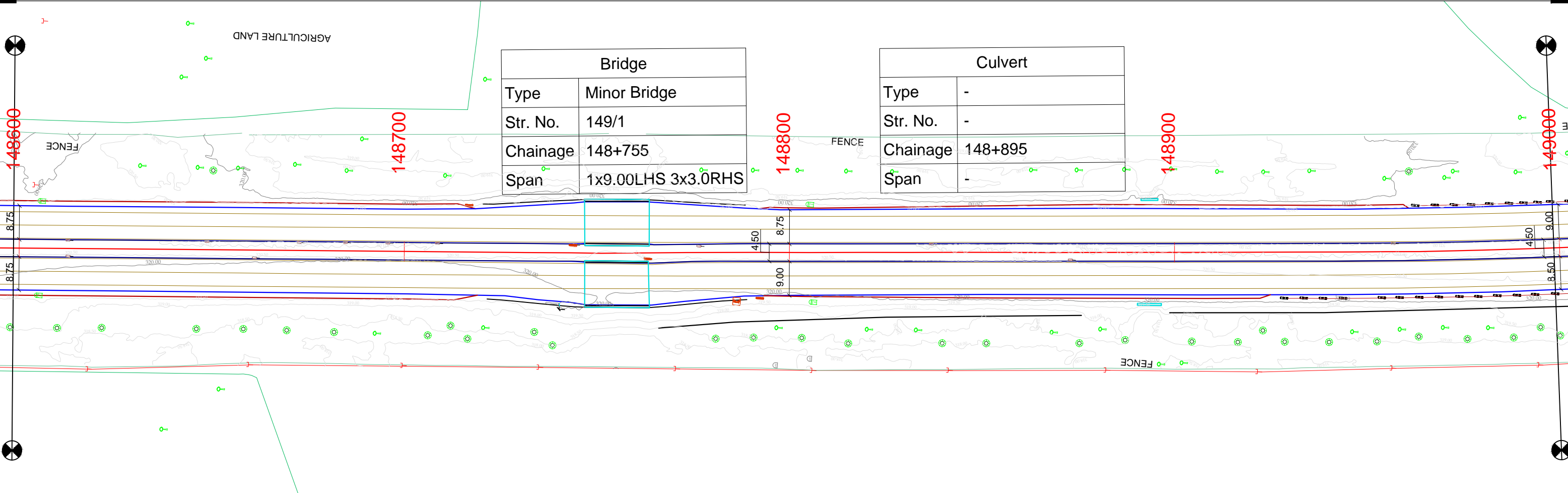
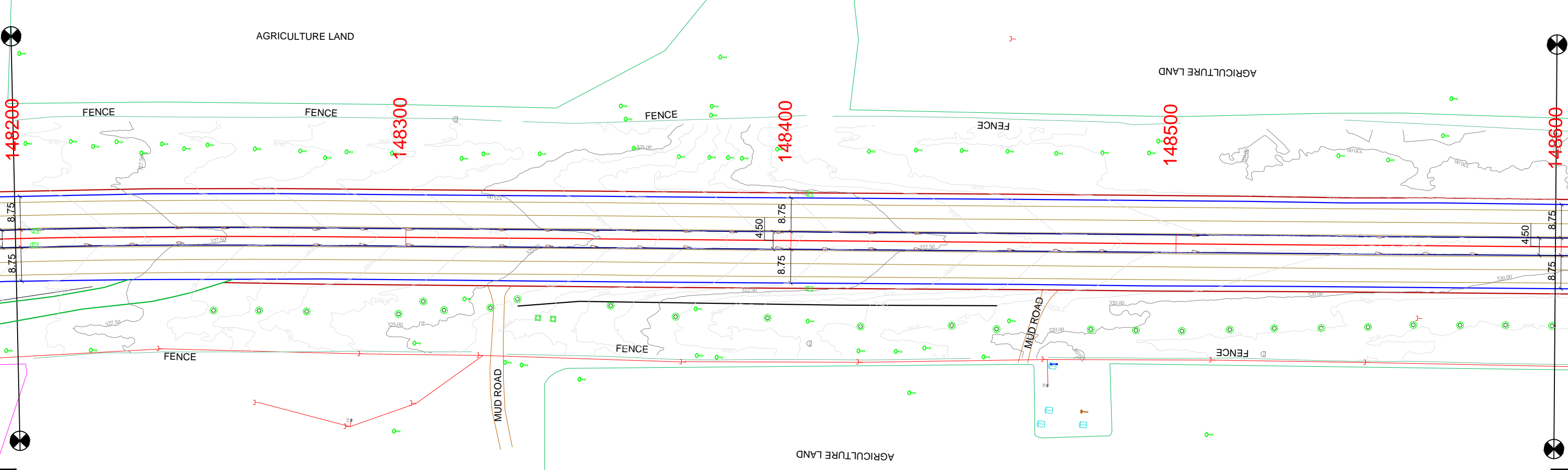
TO KURNOOL >>>





			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYP SA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 146/600 TO 147/400			
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS		CHECKED BY							
				APPROVED BY							

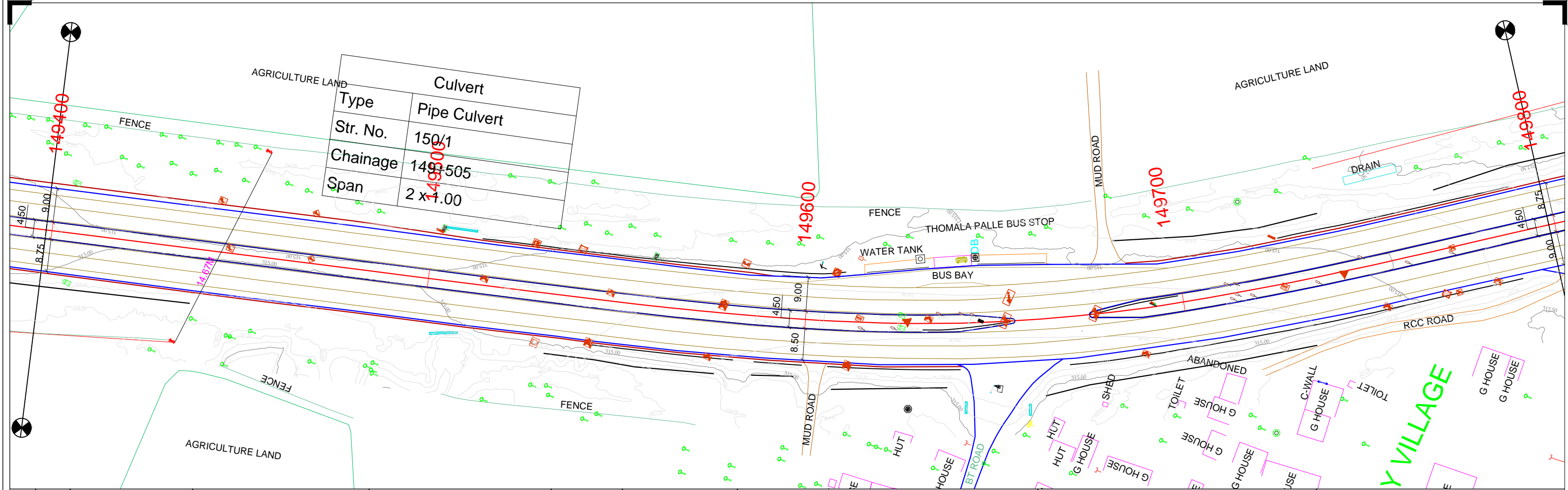
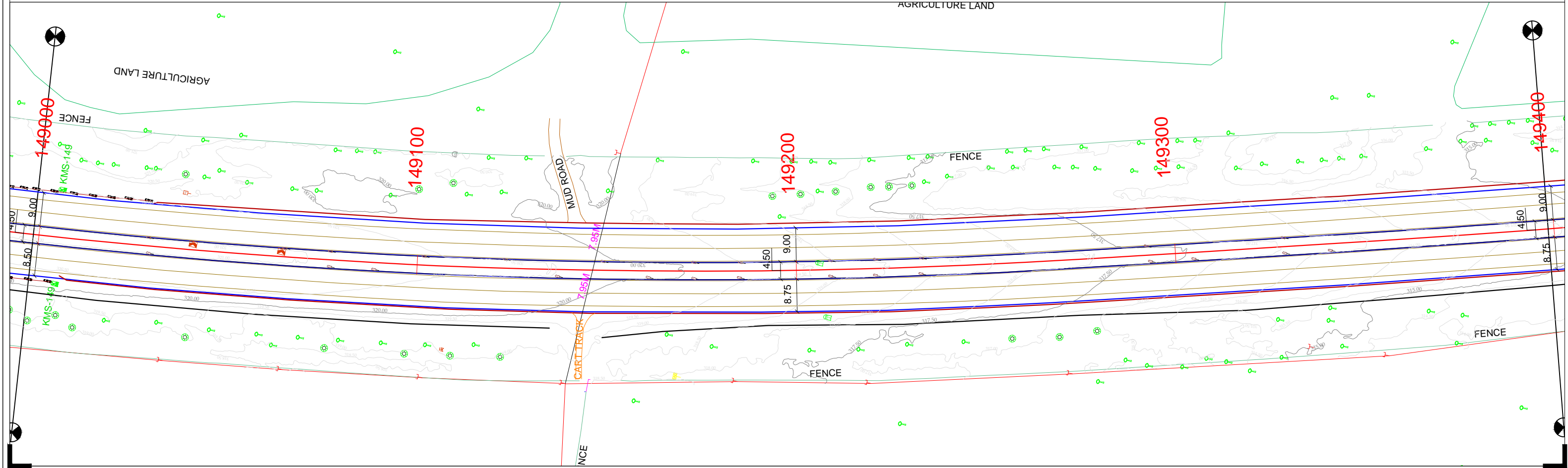





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 147/ 400 TO 148/ 200			
				DESIGN BY				DRAWING NO. AV_TYPSPA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				16 1 : 1000 A3 0			

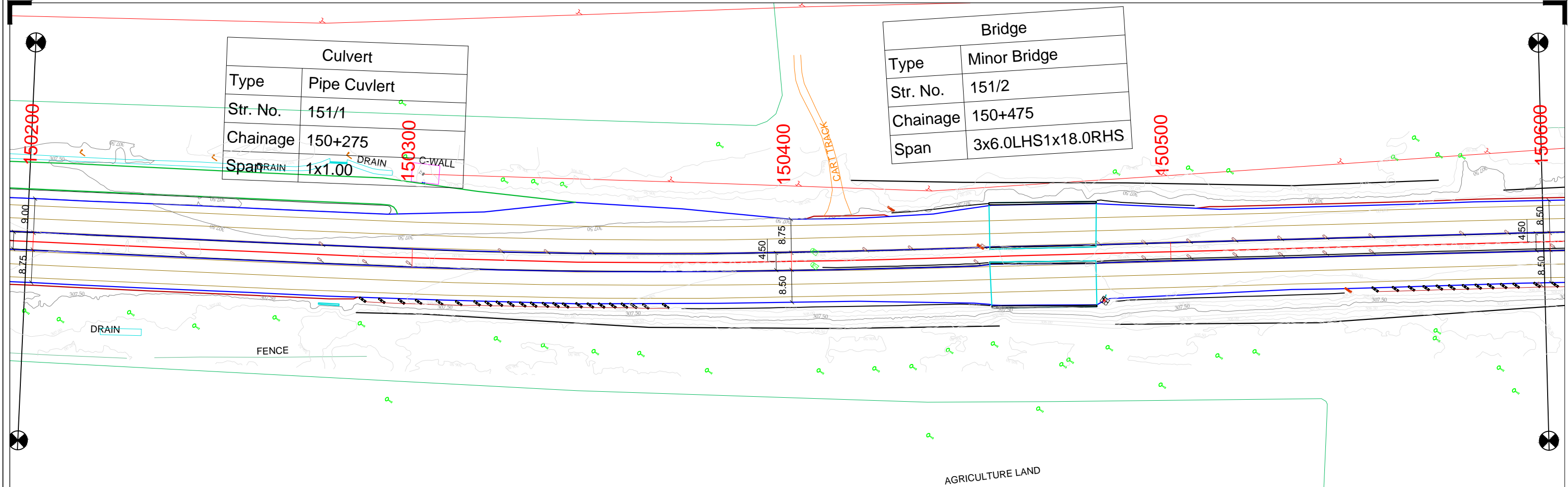
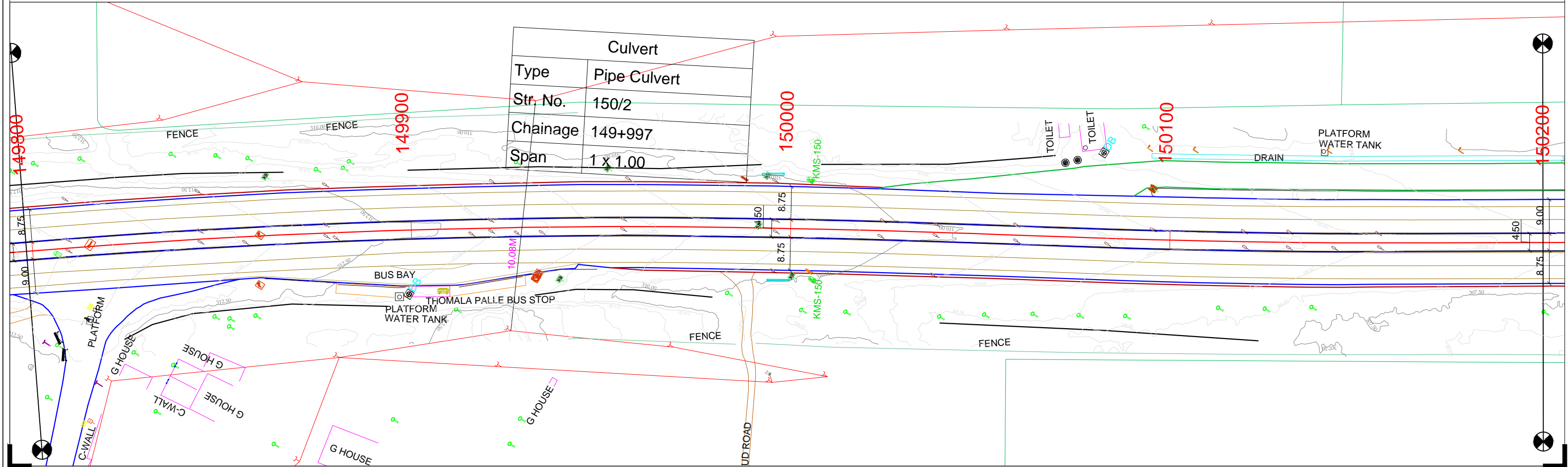


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 148/200 TO 149/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				SCALE			
					6354				SIZE	REV	
									17	0	
									1 : 1000	A3	








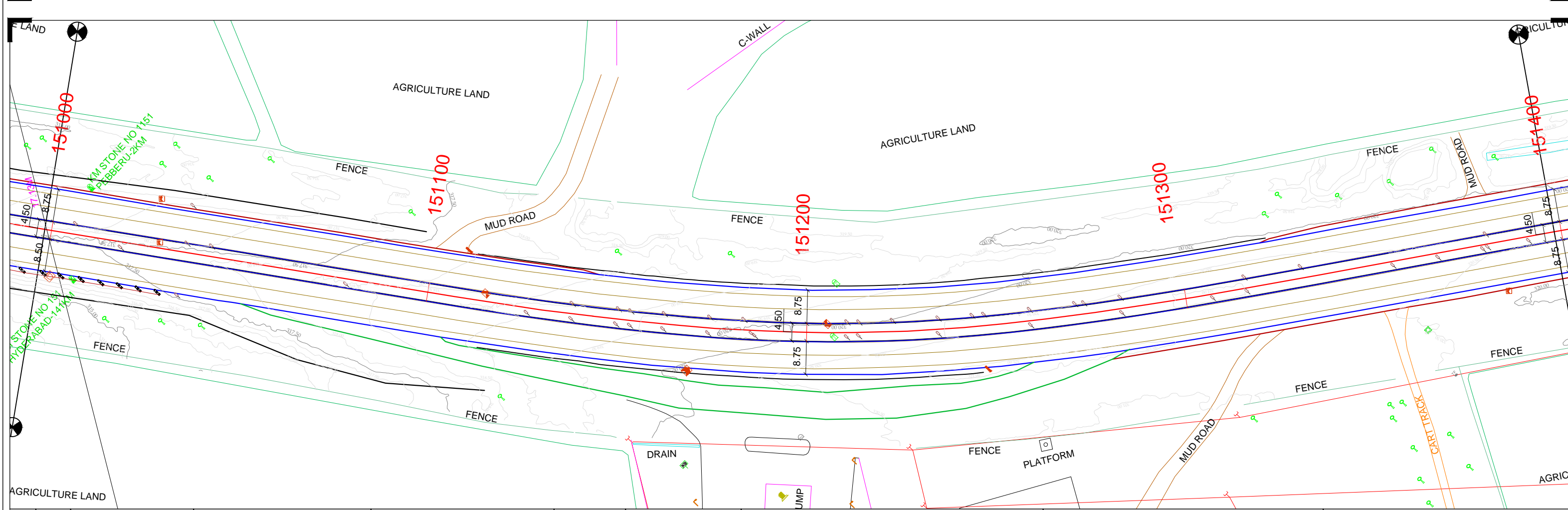
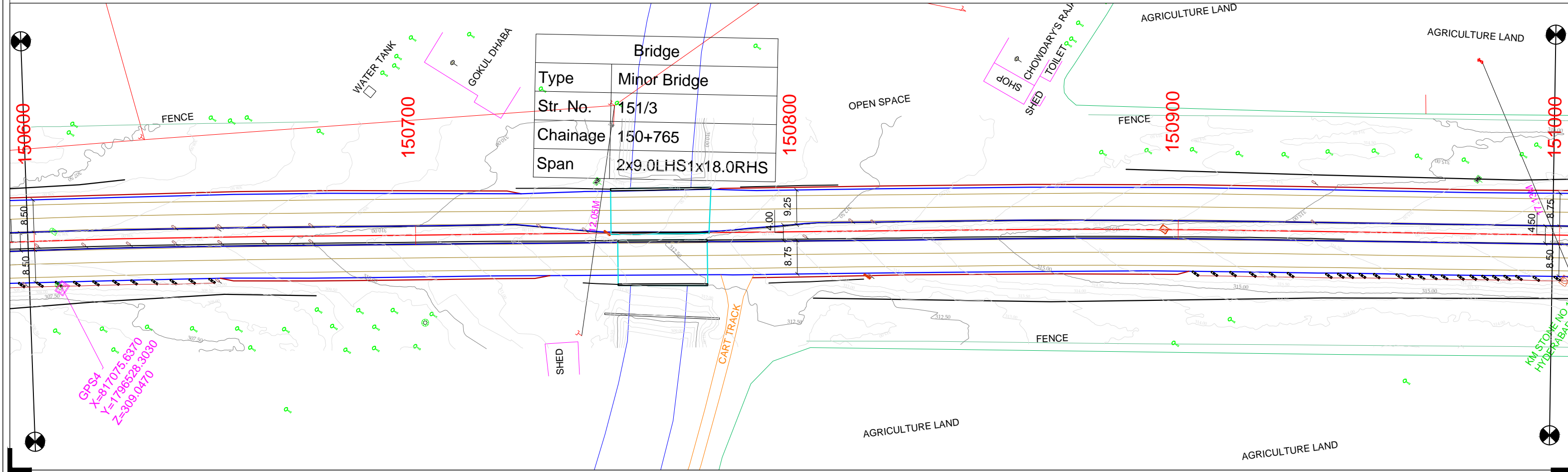
			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 149/000 TO 149/800			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS								SIZE	
							REV				
							18				
							1 : 1000				
							A3				
							0				






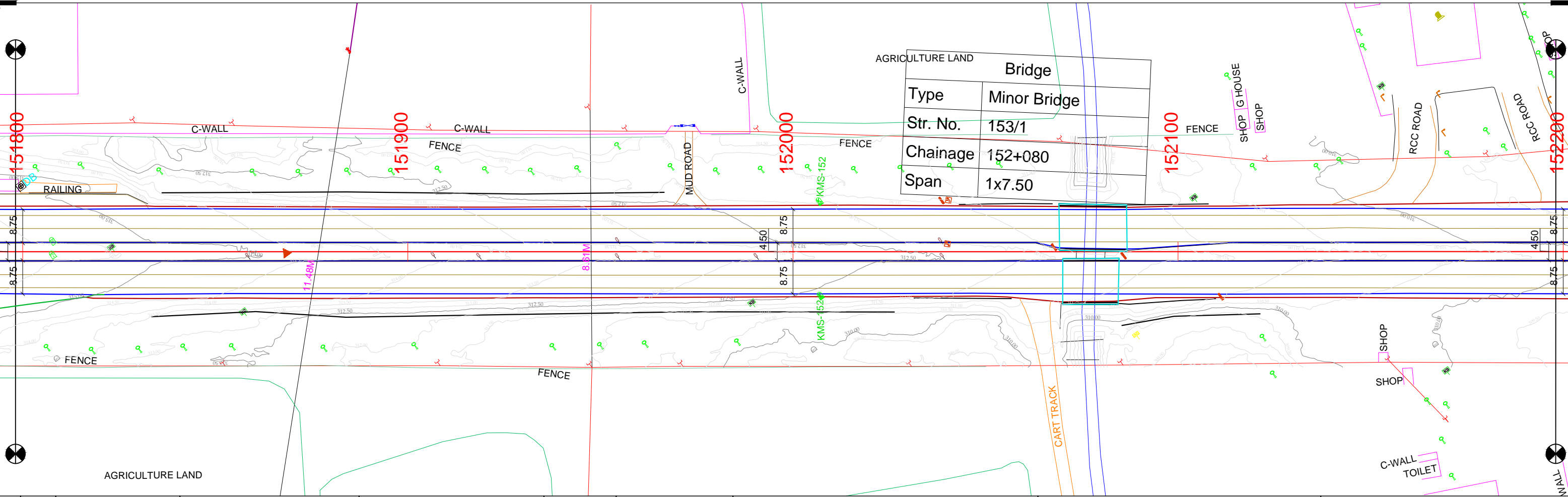
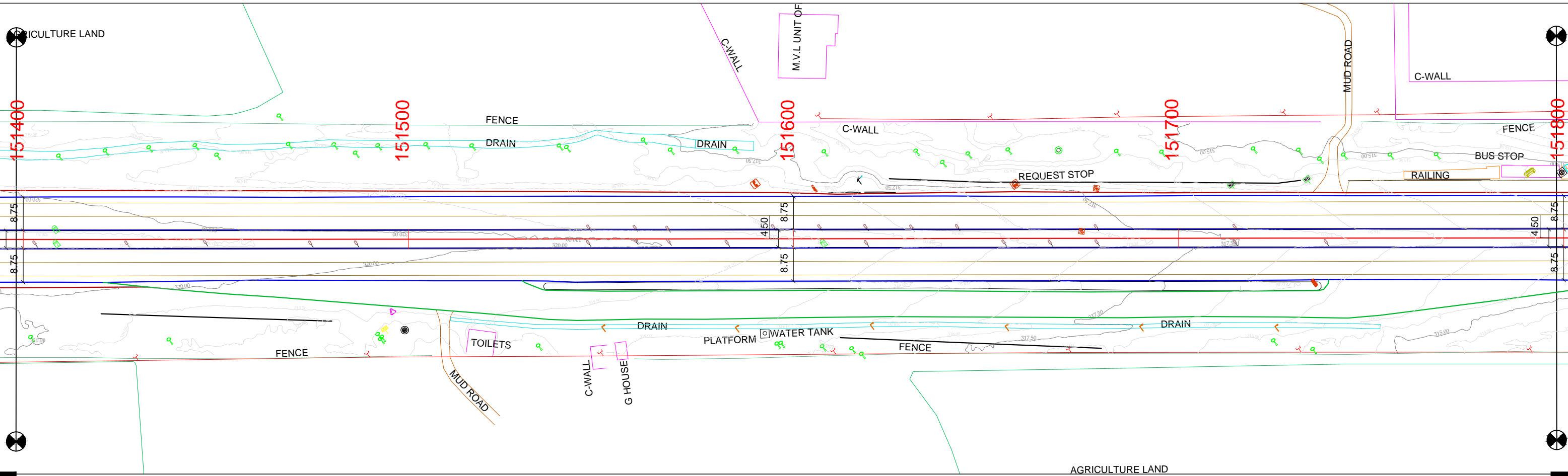
AGRICULTURE LAND

			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd.  </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 149/800 TO 150/600			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				19 1 : 1000 A3 0			





			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 150/600 TO 151/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE	SIZE	REV	
REV	DATE	DESCRIPTION OF REVISIONS						20	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

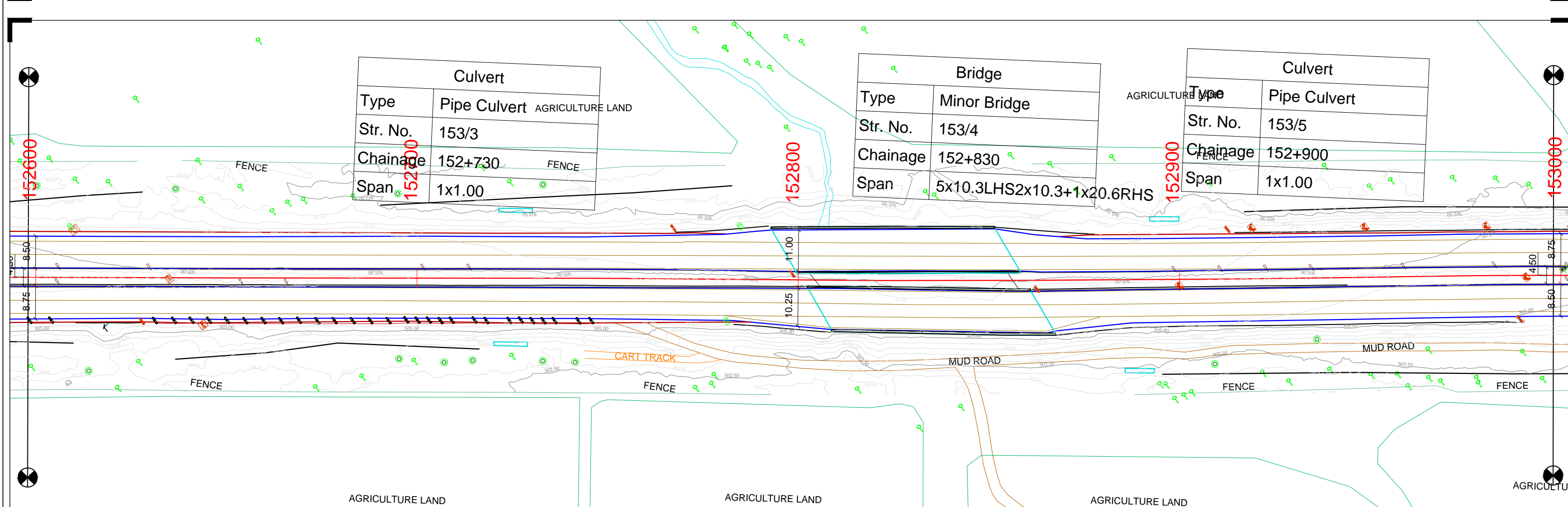
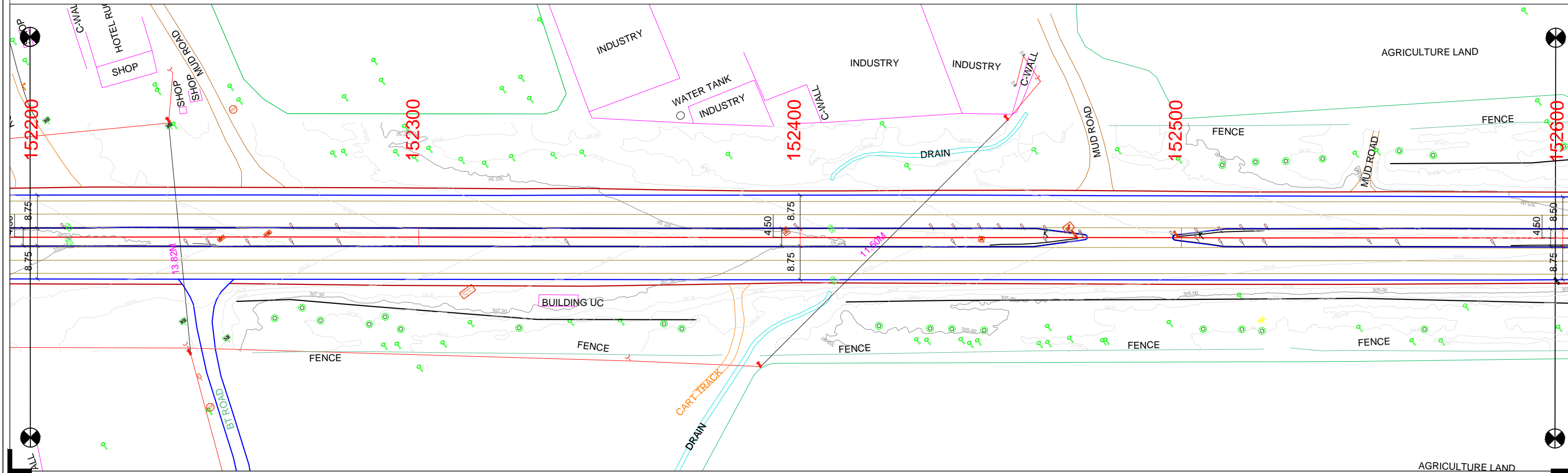
TITLE:- KMS 151/400 TO 152/200			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
21	1 : 1000	A3	0



<<< TO KOTHAKOTA

(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>






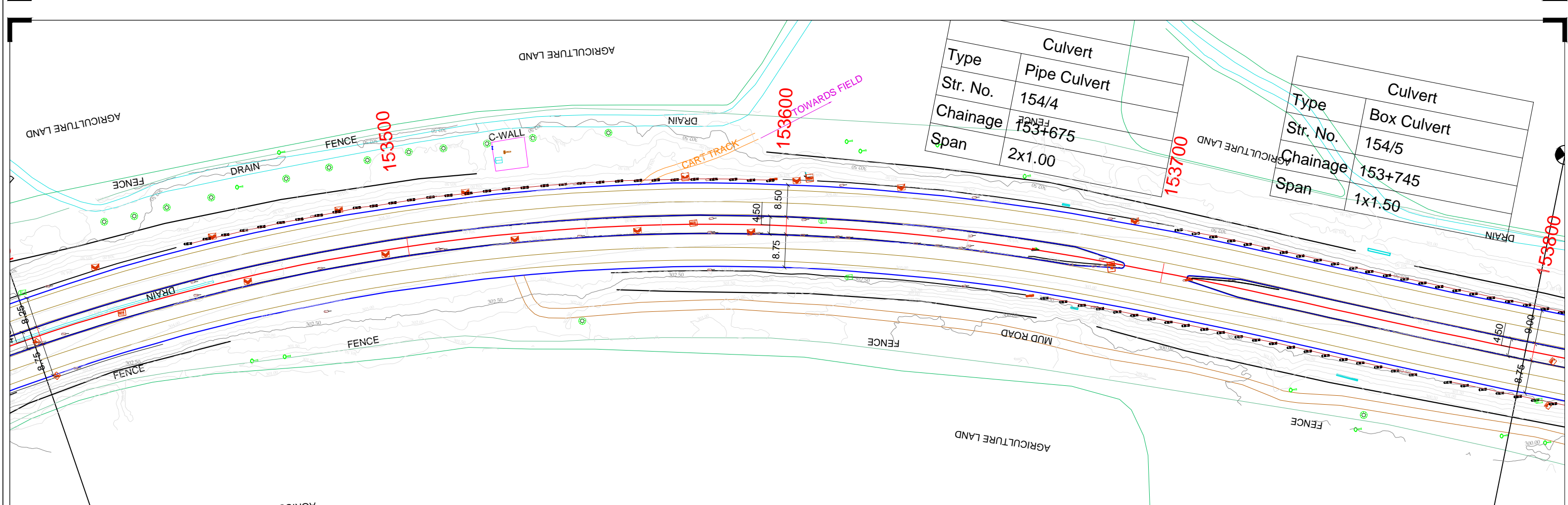
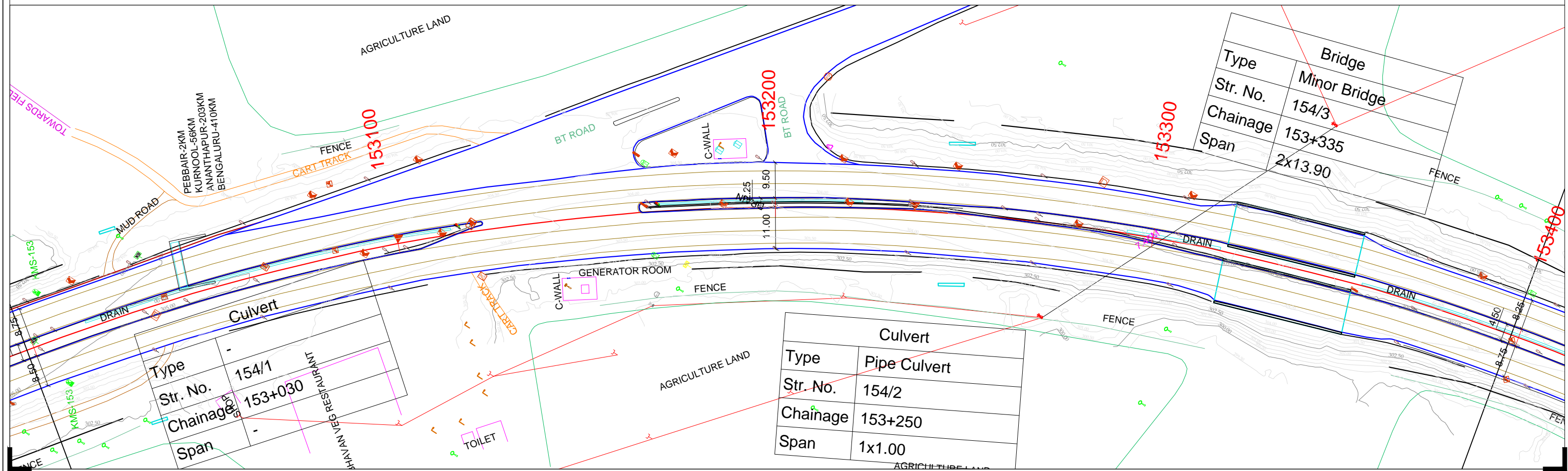
AGRICULTURE LAND




AGRICULTURE LAND

AGRICULTURE LAND

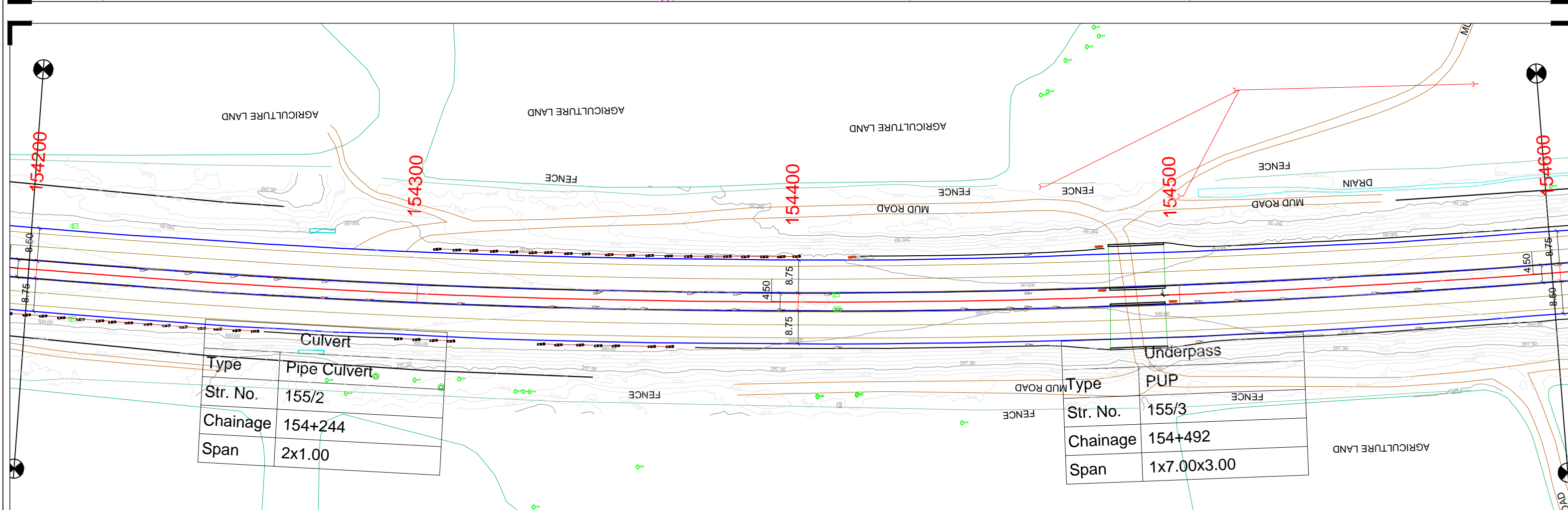
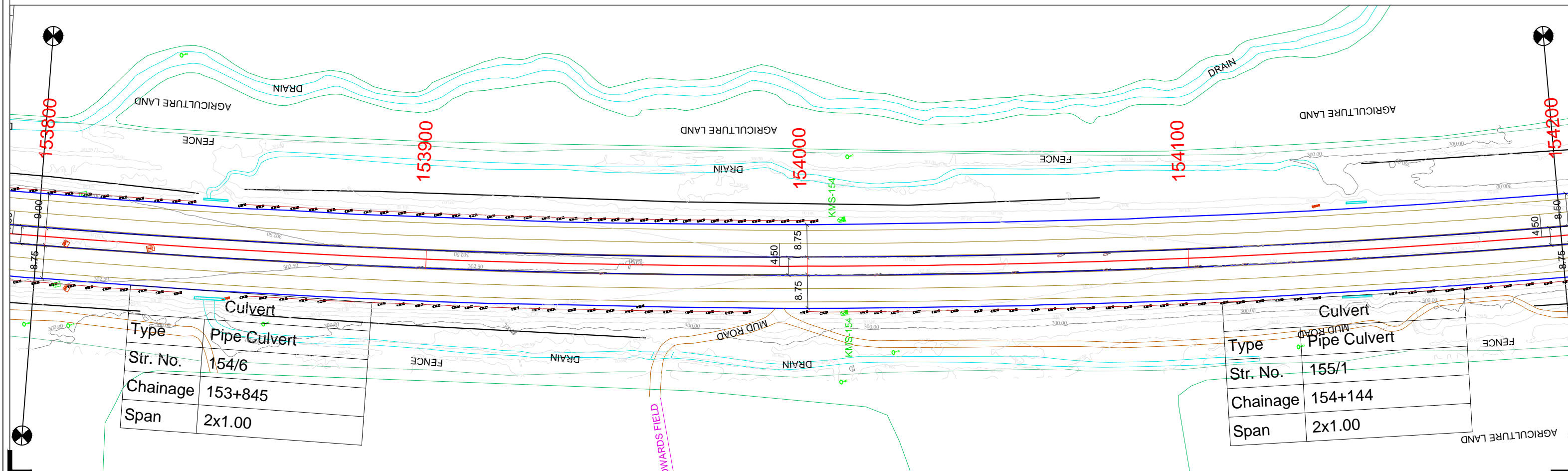
AGRICULTURE LAND




			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 152/200 TO 153/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				22 1 : 1000 A3 0			



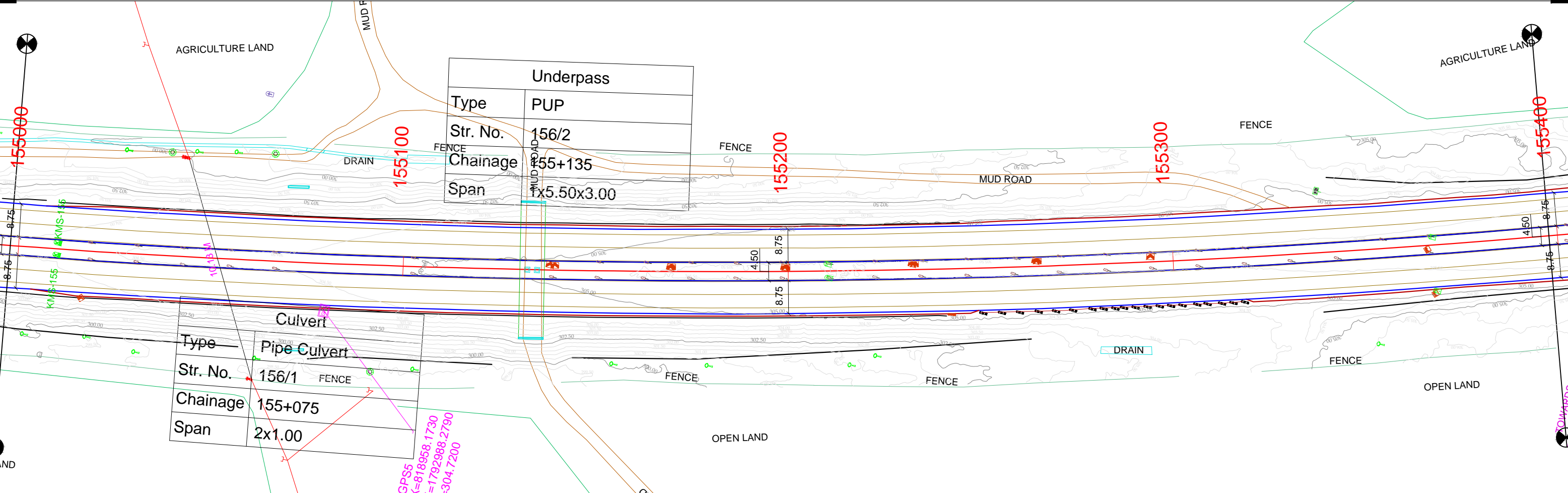
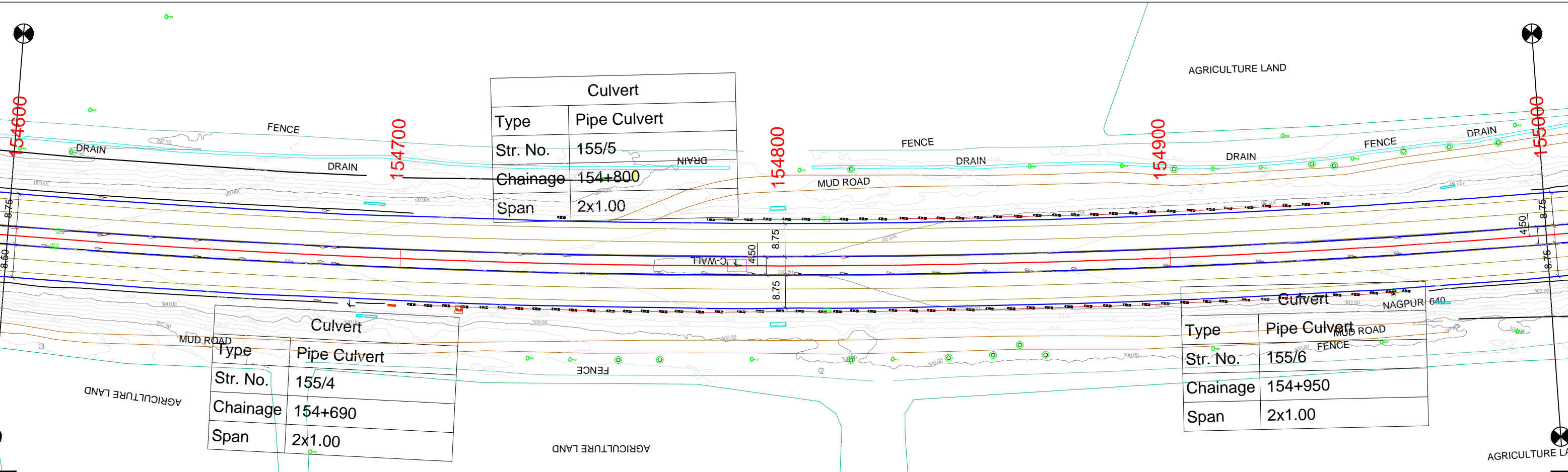
			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPISA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 153/000 TO 153/800			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				23 1 : 1000 A3 0			

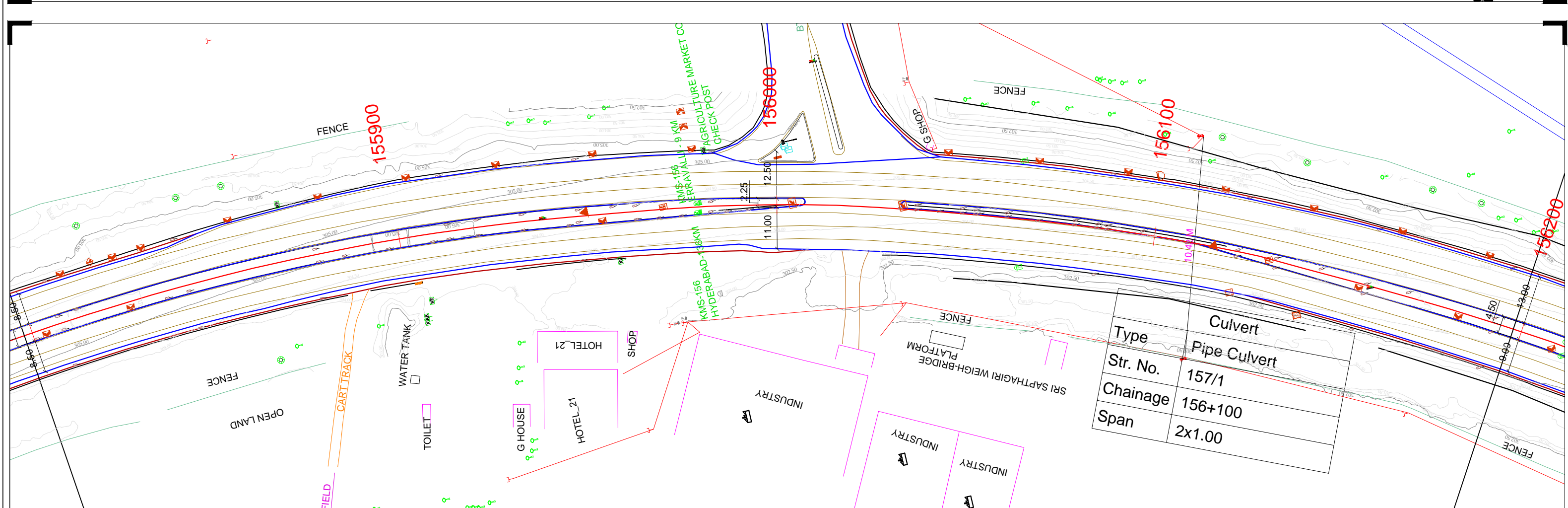
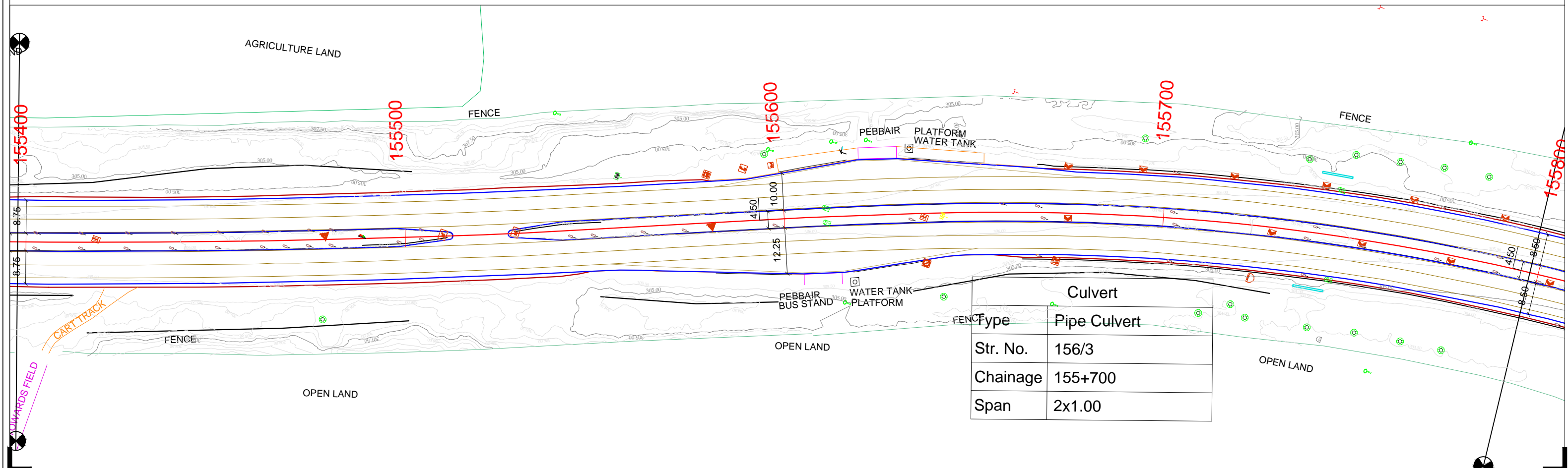






			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 153/800 TO 154/600			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				24 1 : 1000 A3 0			

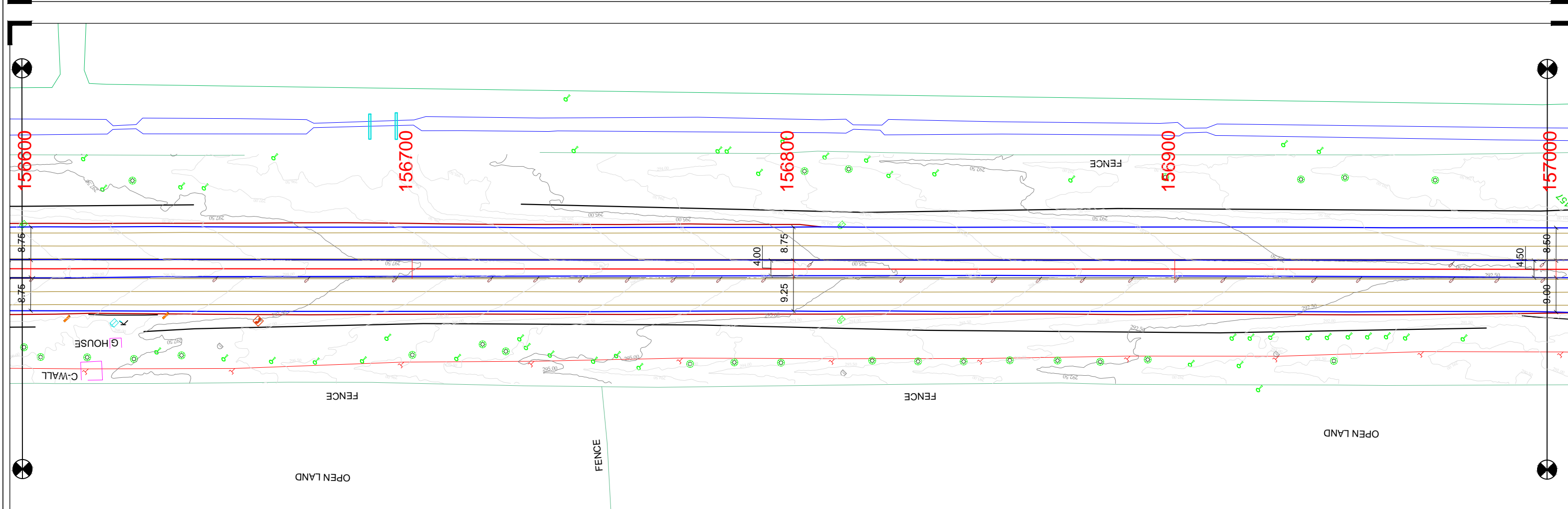
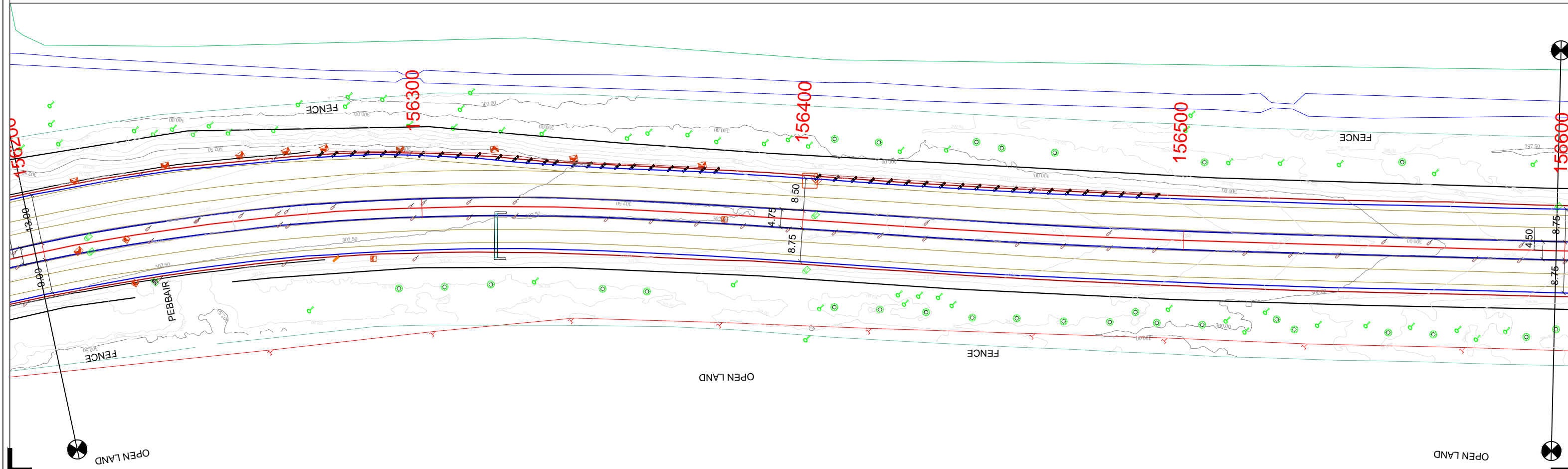






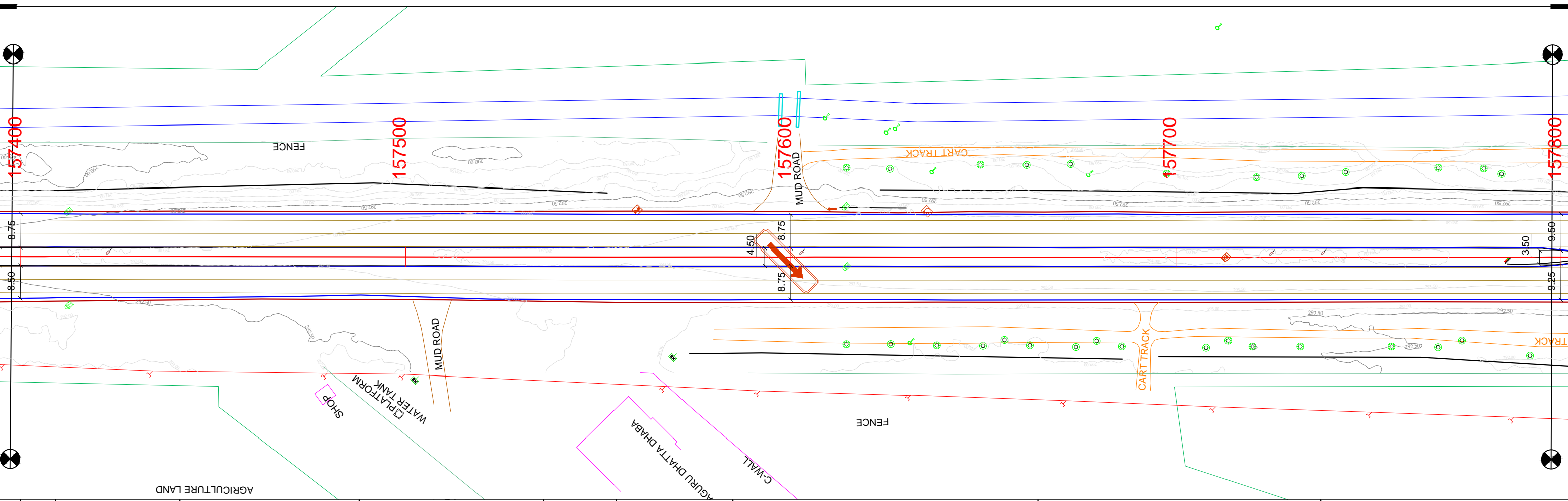
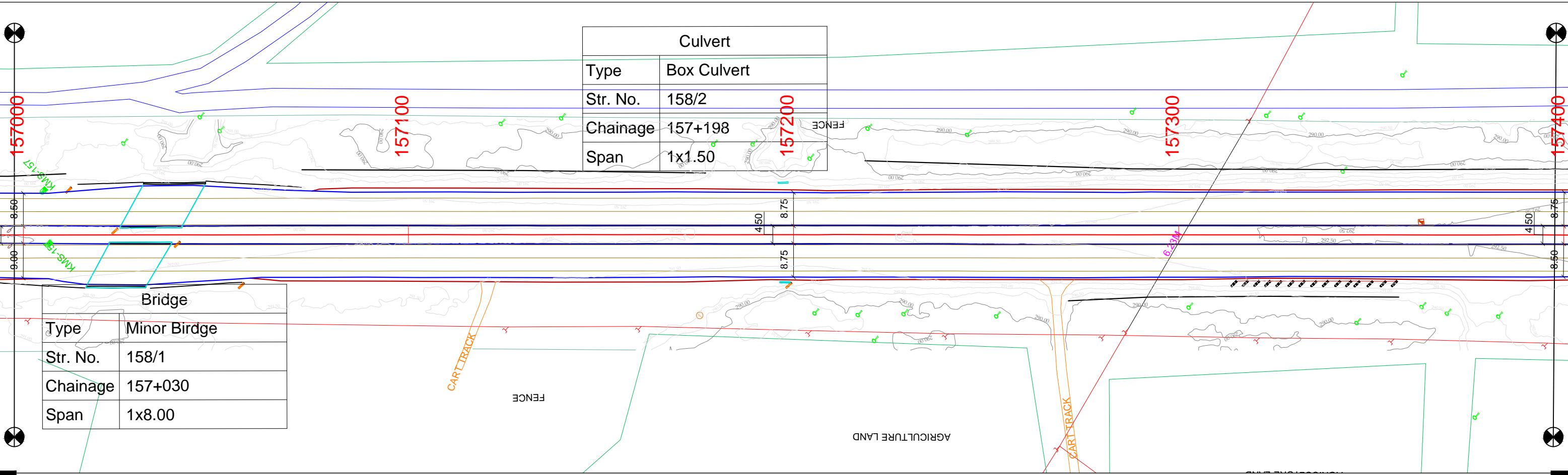


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 155/400 TO 156/200			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				26 1 : 1000 A3 0			





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 156/200 TO 157/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS							SIZE		
								27	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

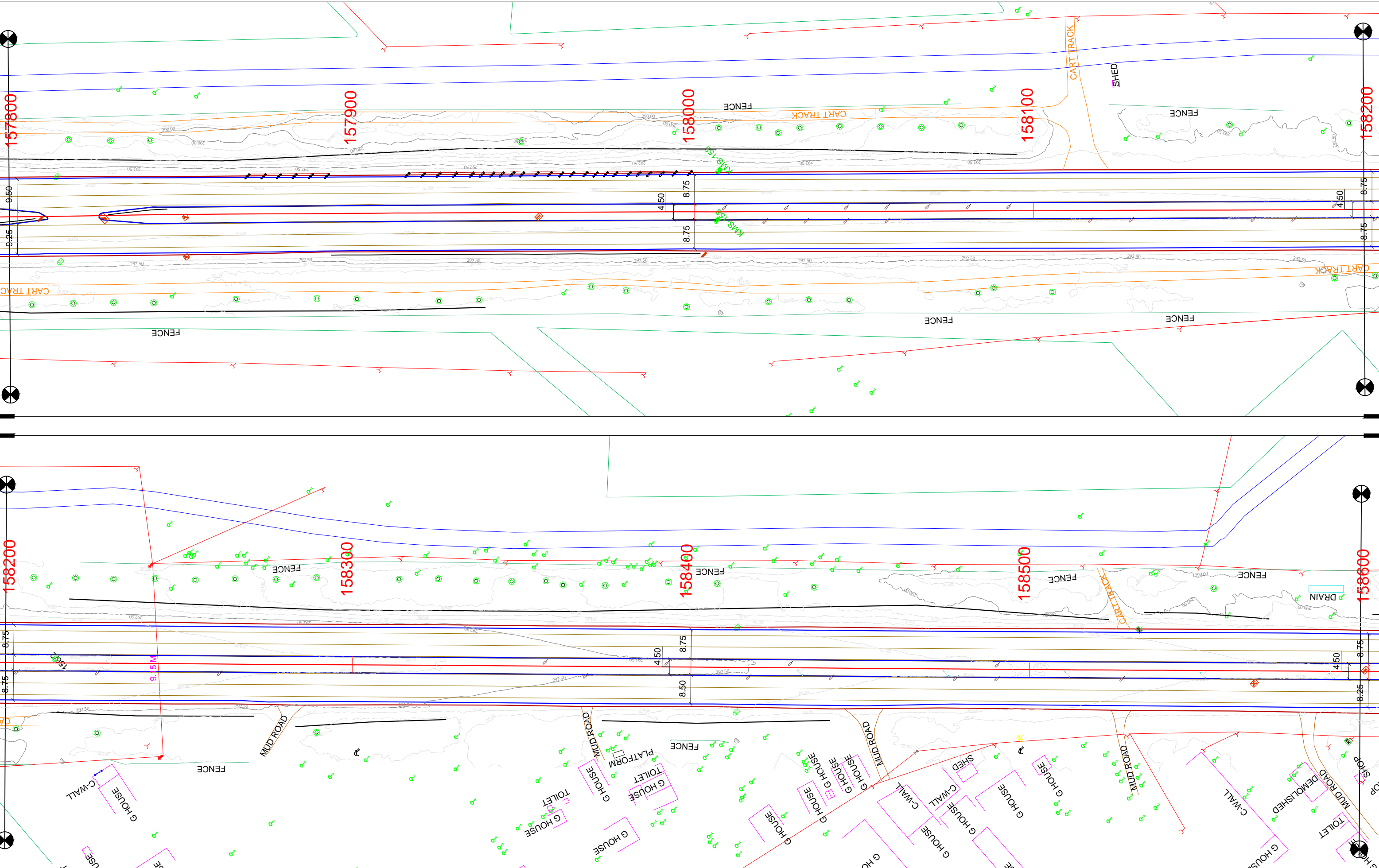
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

PROJECT :-


Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 157/000 TO 157/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
28	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

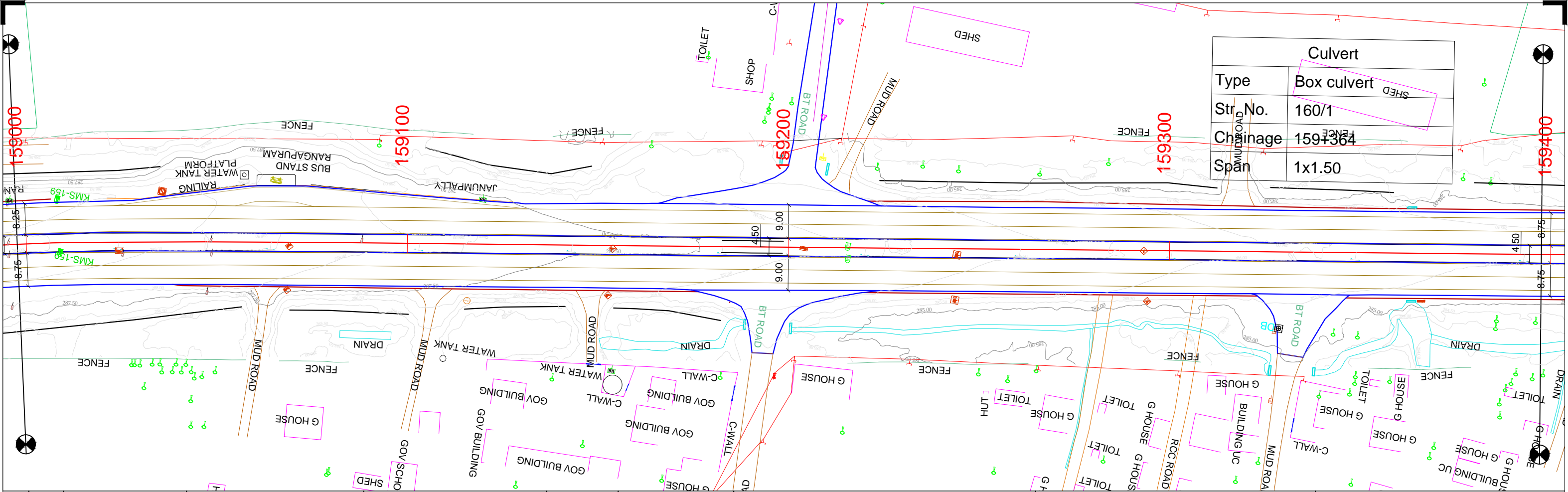
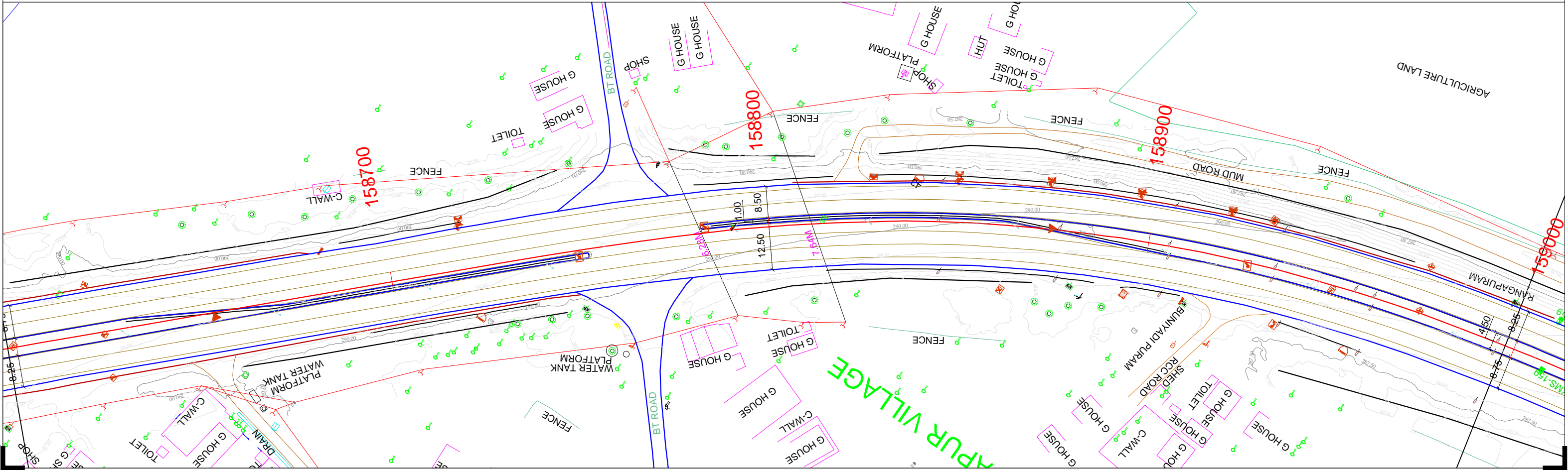
  


PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 157/800 TO 158/600			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
29	1 : 1000	A3	0





Culvert	
Type	Box culvert
Str. No.	160/1
Chainage	159+364
Span	1x1.50

REV	DATE	DESCRIPTION OF REVISIONS



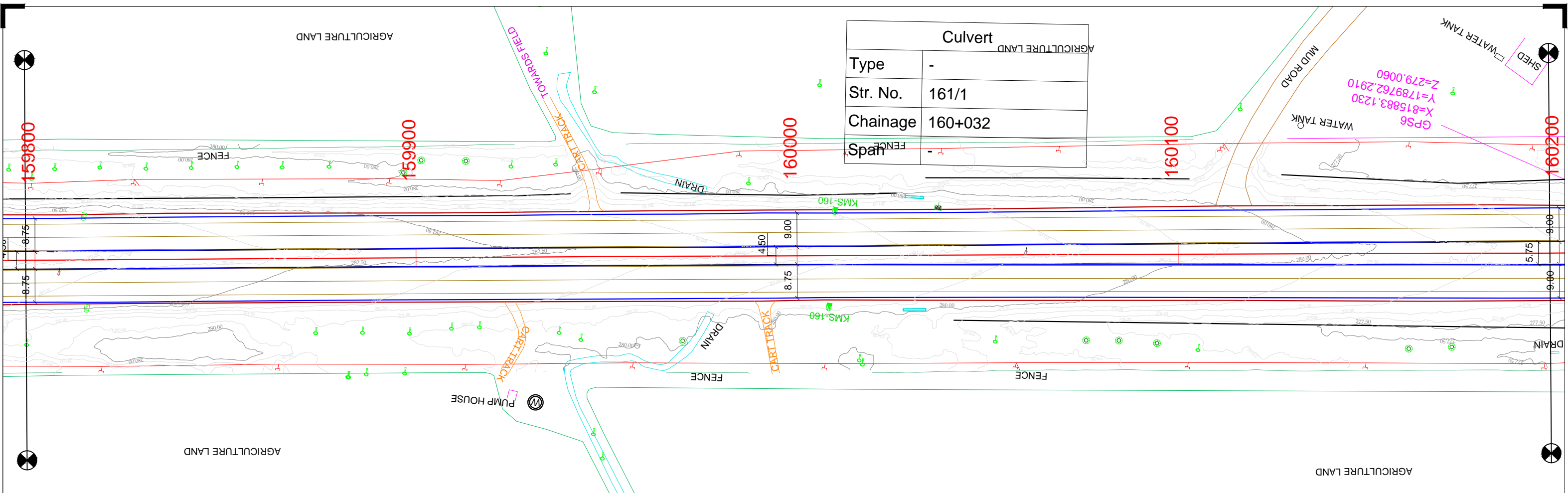
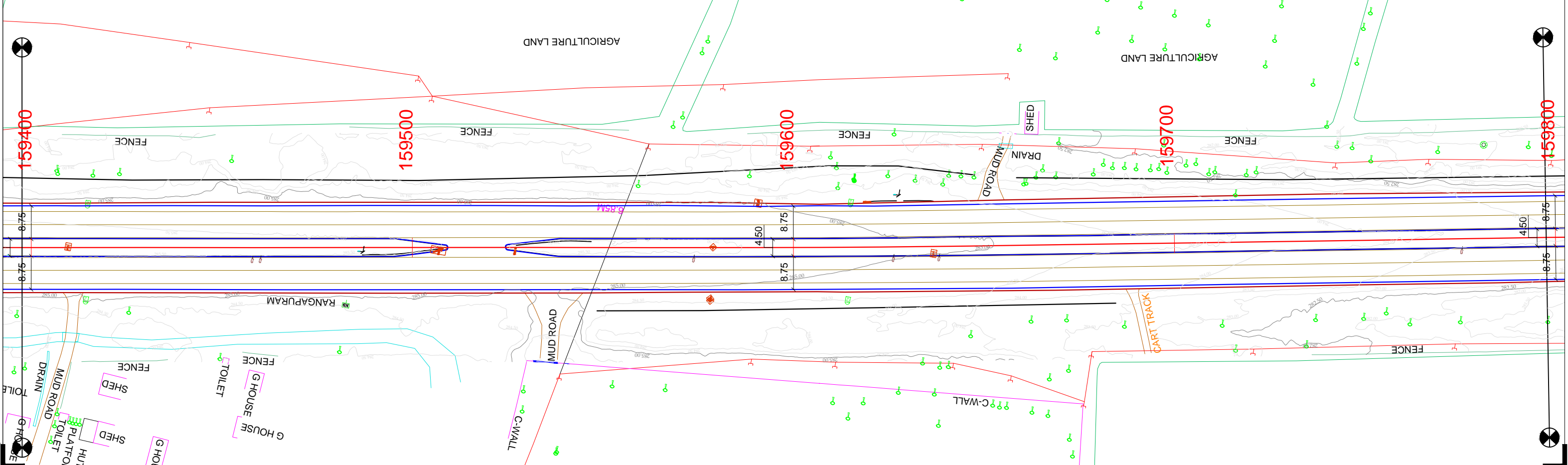
CLIENT :-  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**




DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-  
**TYP SA in JV with  
AVANZA Engineering Pvt. Ltd.**

PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 158/600 TO 159/400			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
30	1 : 1000	A3	0



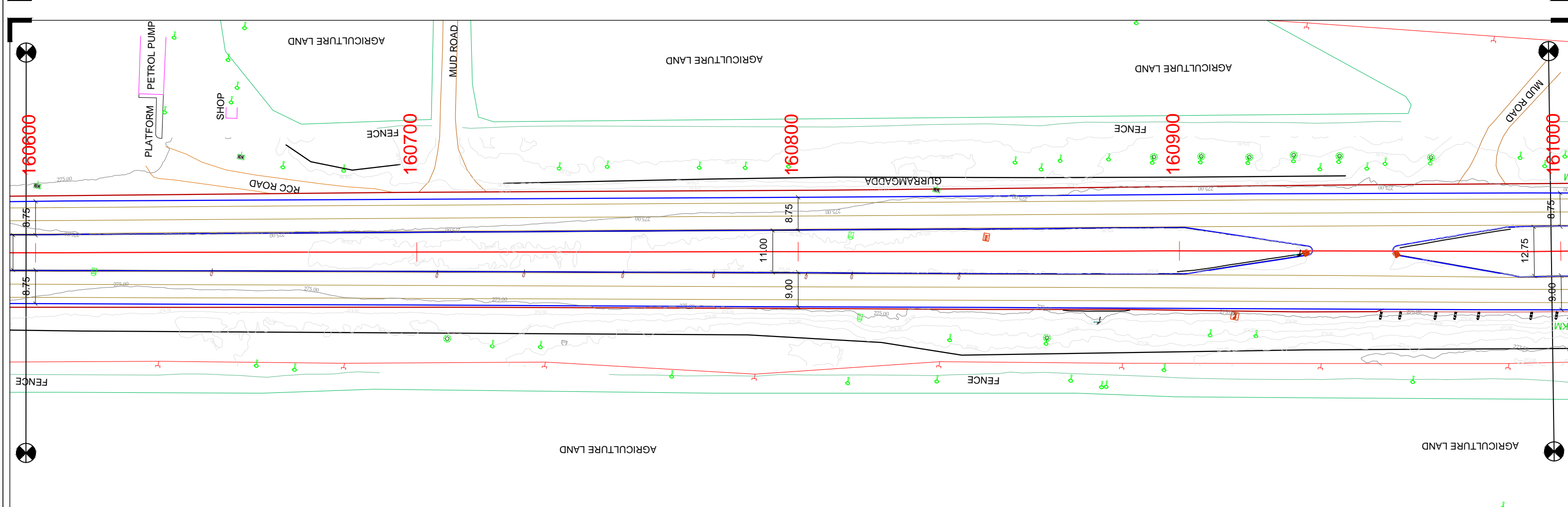
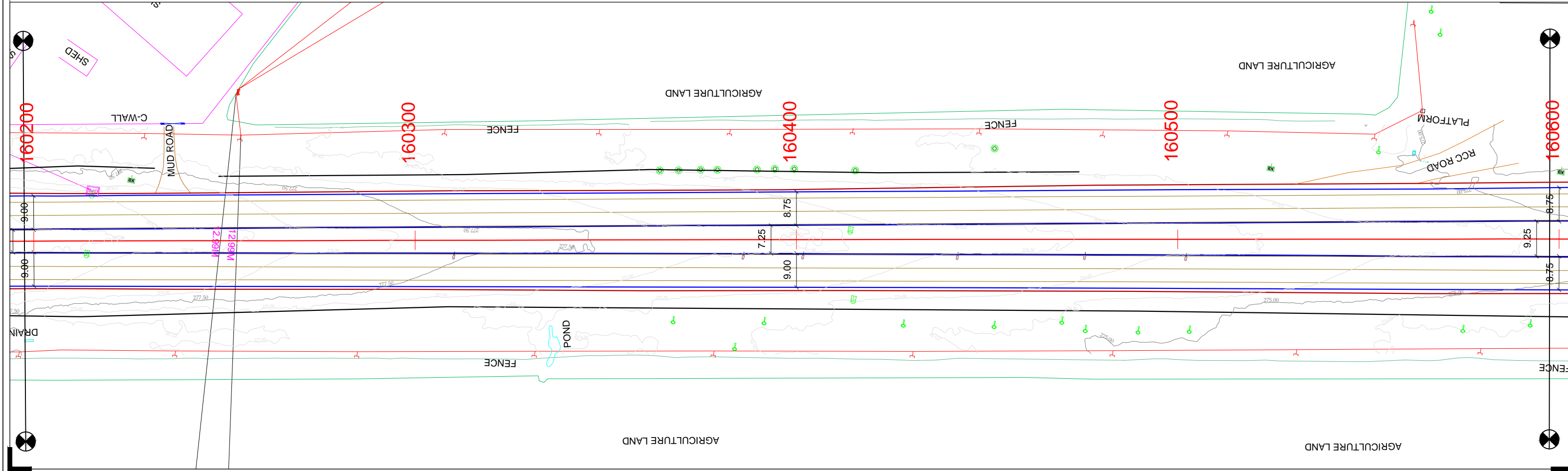
			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 159/400 TO 160/200			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				31 1 : 1000 A3 0			





<<< TO KOTHAKOTA

(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>

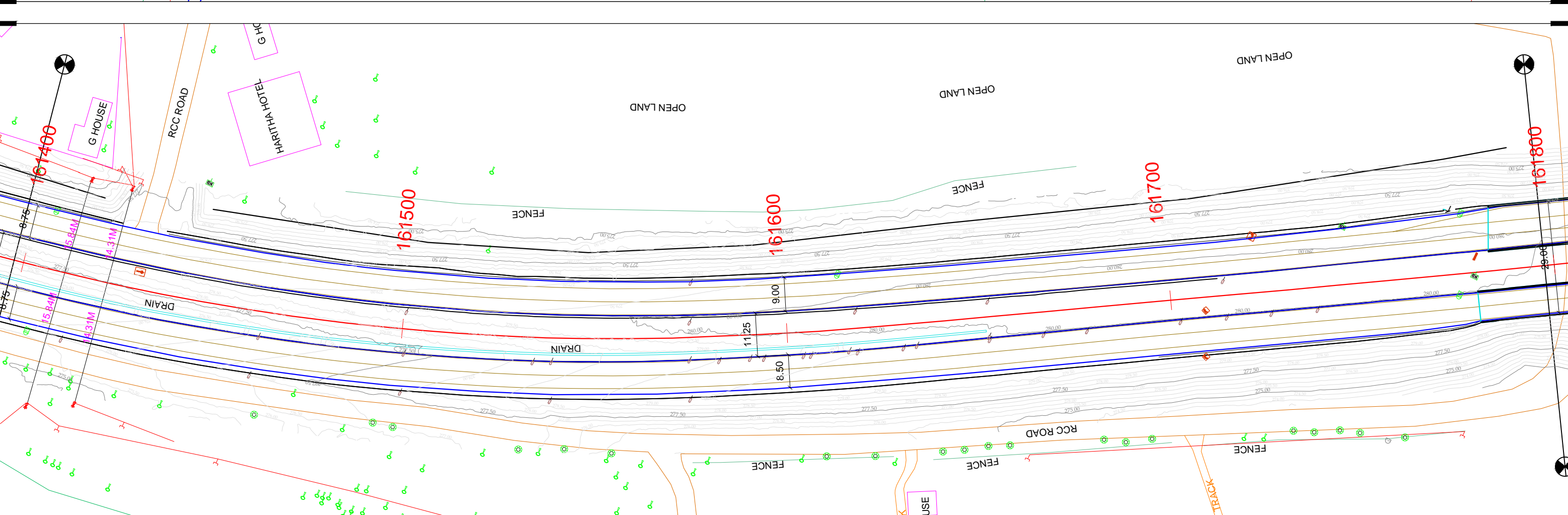
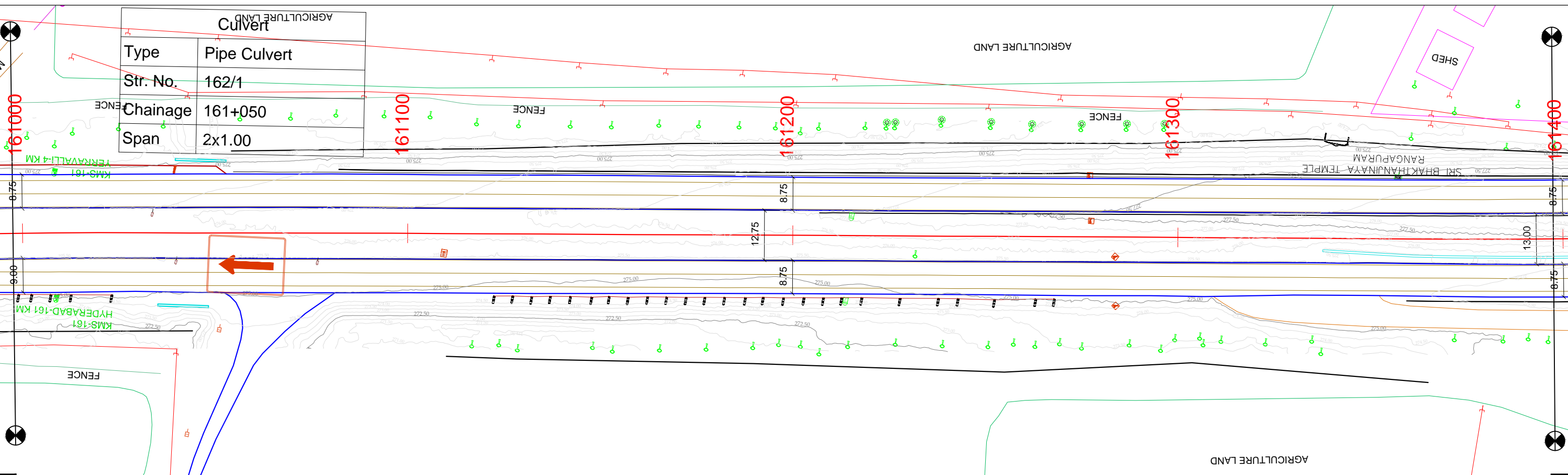


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 160/200 TO 161/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				32 1 : 1000 A3 0			


<<< TO KOTHAKOTA

(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP



TO KURNOOL >>>



REV	DATE	DESCRIPTION OF REVISIONS

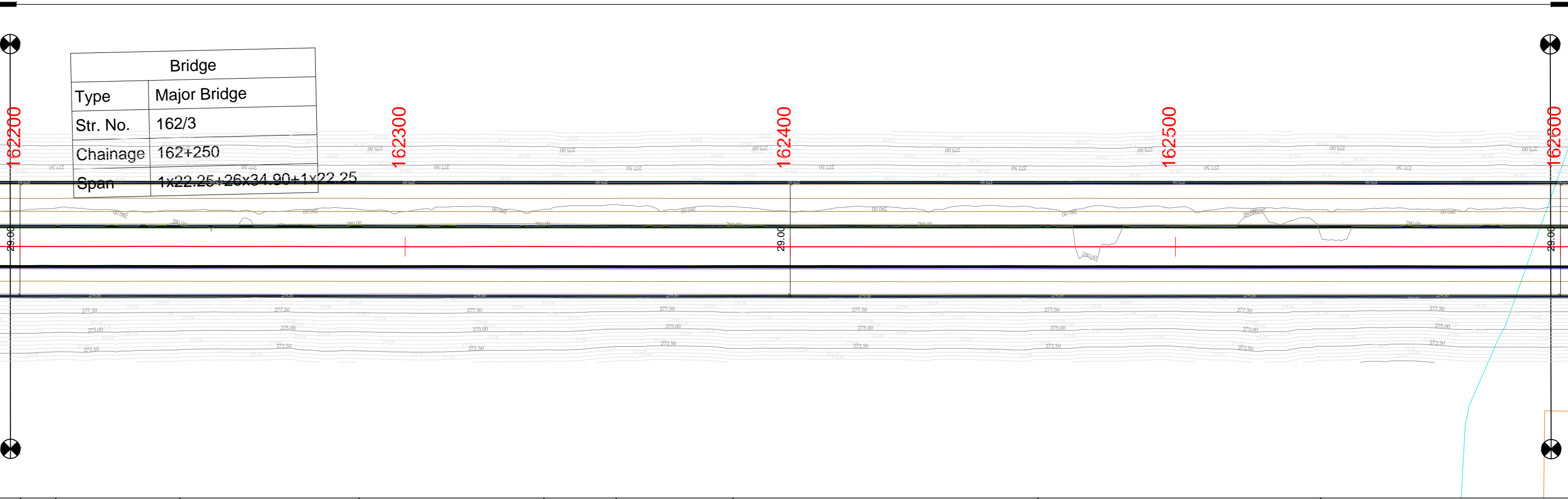
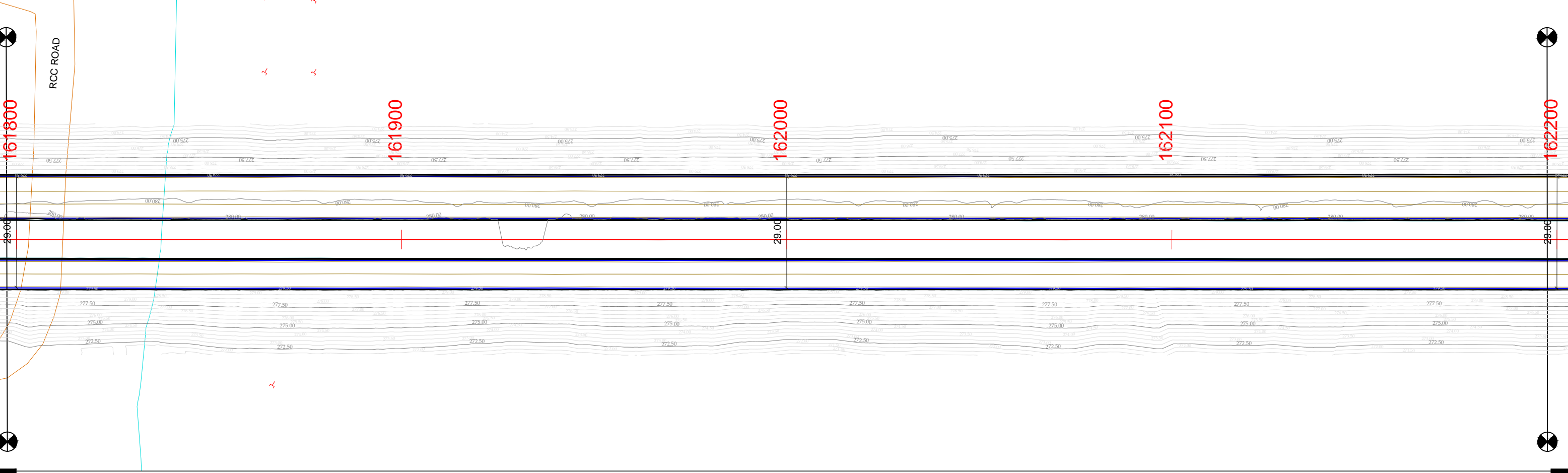
CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

DRAWN BY  
DESIGN BY  
CHECKED BY  
APPROVED BY




CONSULTANT:-  
TYPISA in JV with  
AVANZA Engineering Pvt. Ltd.  
  


PROJECT :-  
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

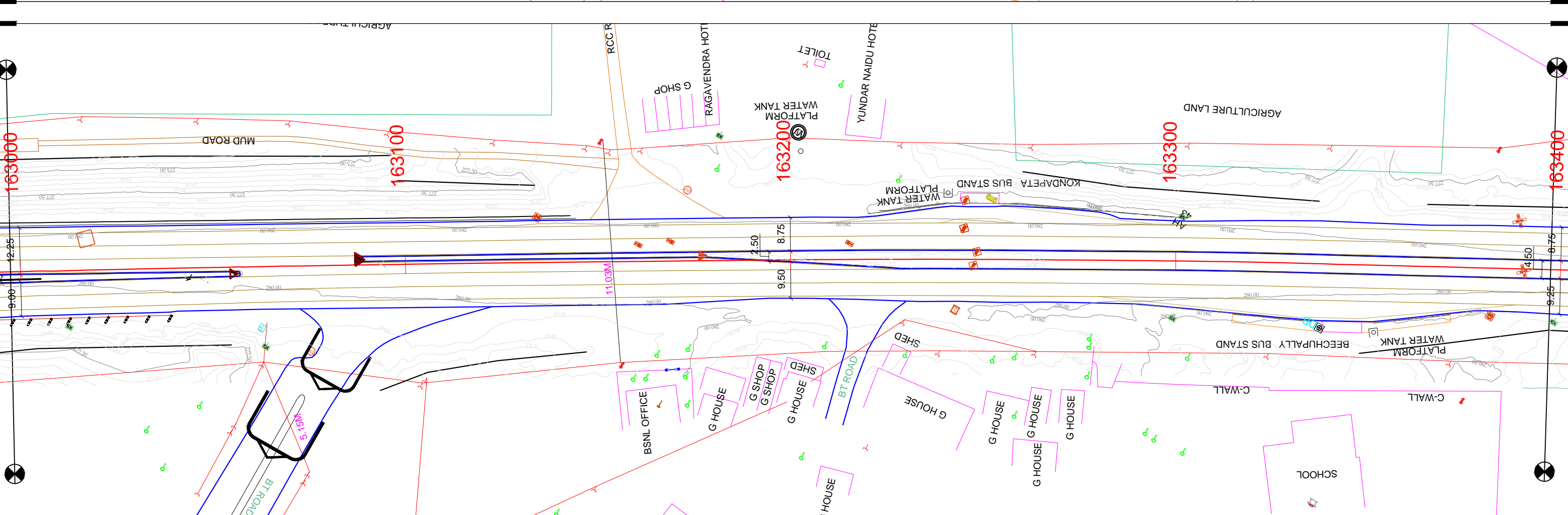
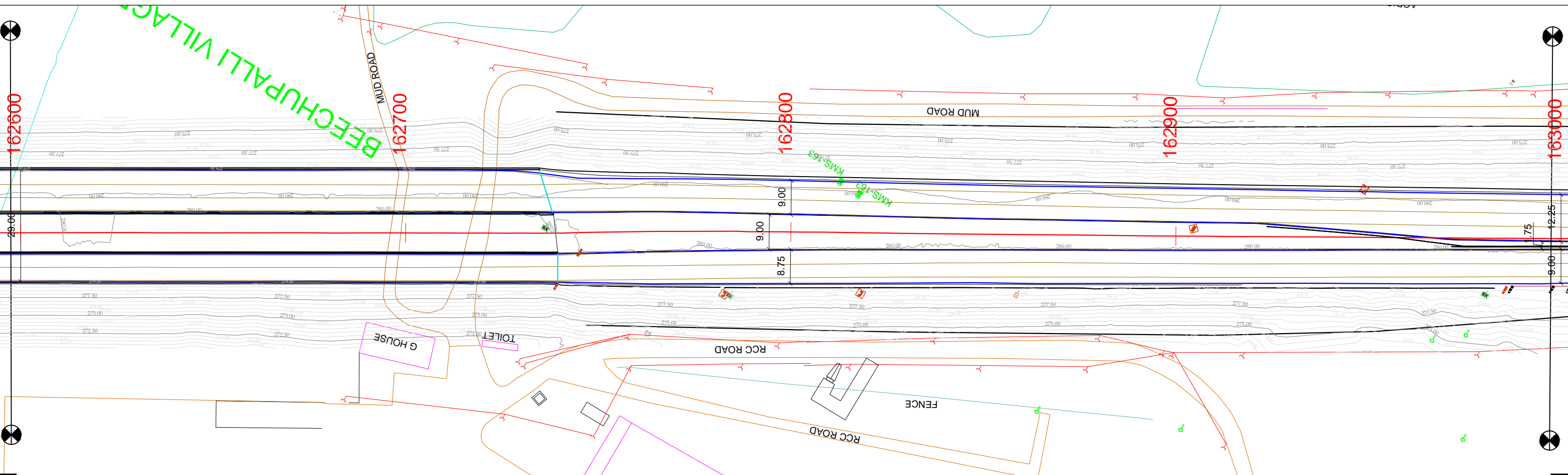
TITLE:-	KMS 161/000 TO 161/800			
DRAWING NO.	AV_TYPISA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV	
33	1 : 1000	A3	0	





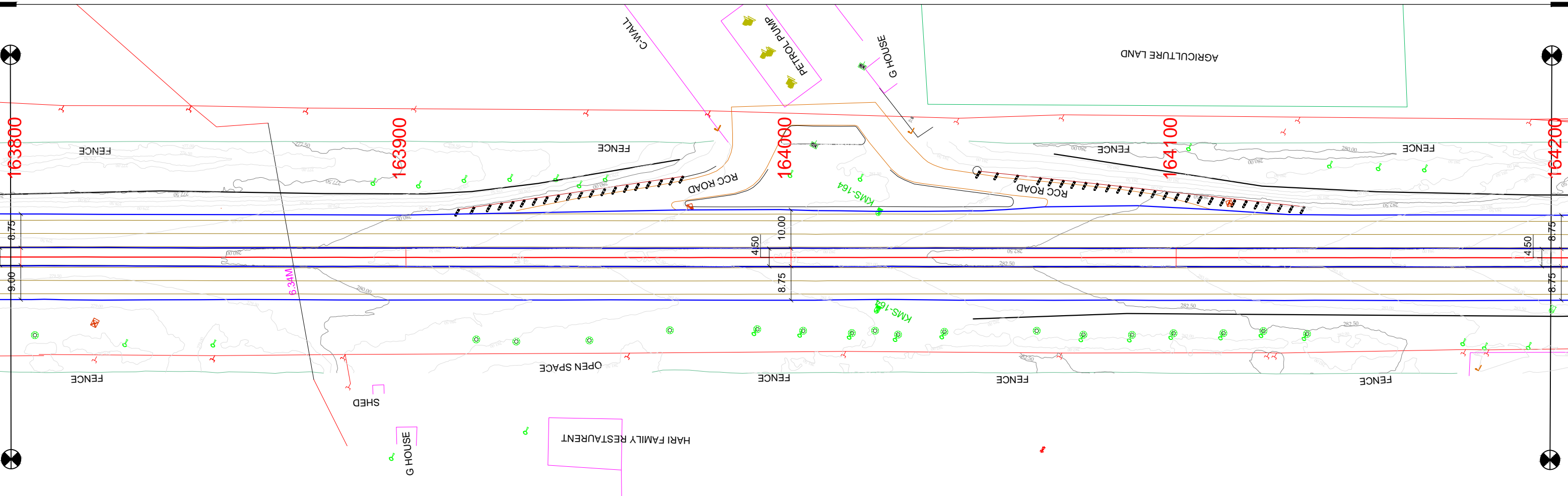
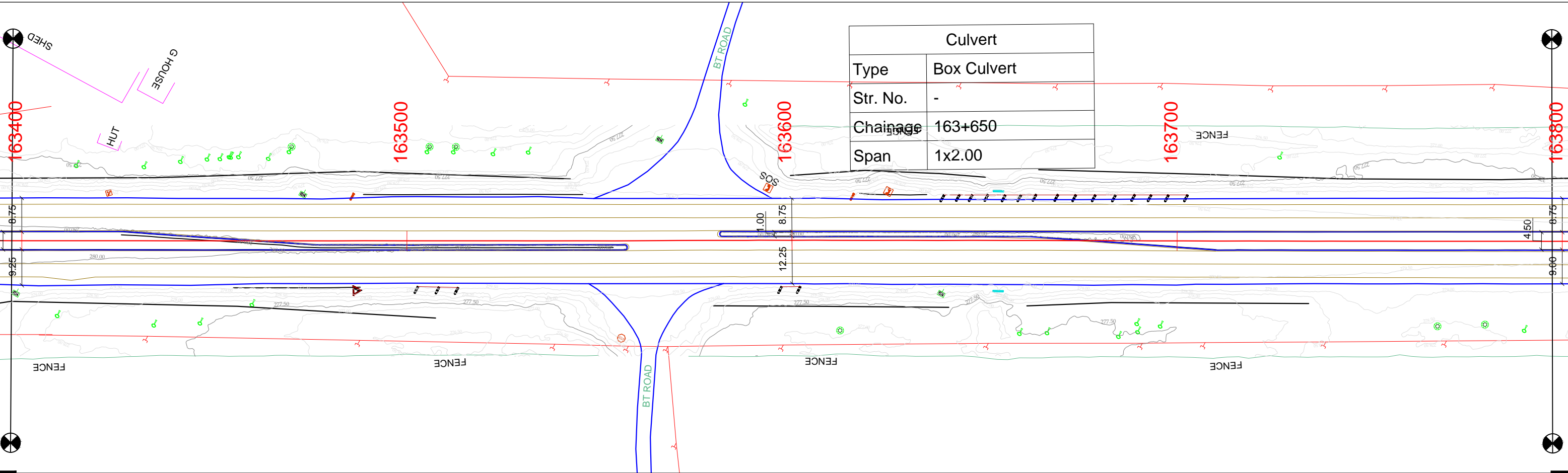
Bridge	
Type	Major Bridge
Str. No.	162/3
Chainage	162+250
Span	1x22.25+26x34.90+1x22.25

			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd.  	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 161/800 TO 162/600			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
				APPROVED BY				34	1 : 1000	A3	0
REV	DATE	DESCRIPTION OF REVISIONS									






			<div>CLIENT :-  <b>NATIONAL HIGHWAY AUTHORITY OF INDIA</b></div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 162/600 TO 163/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				35 1 : 1000 A3 0			



REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

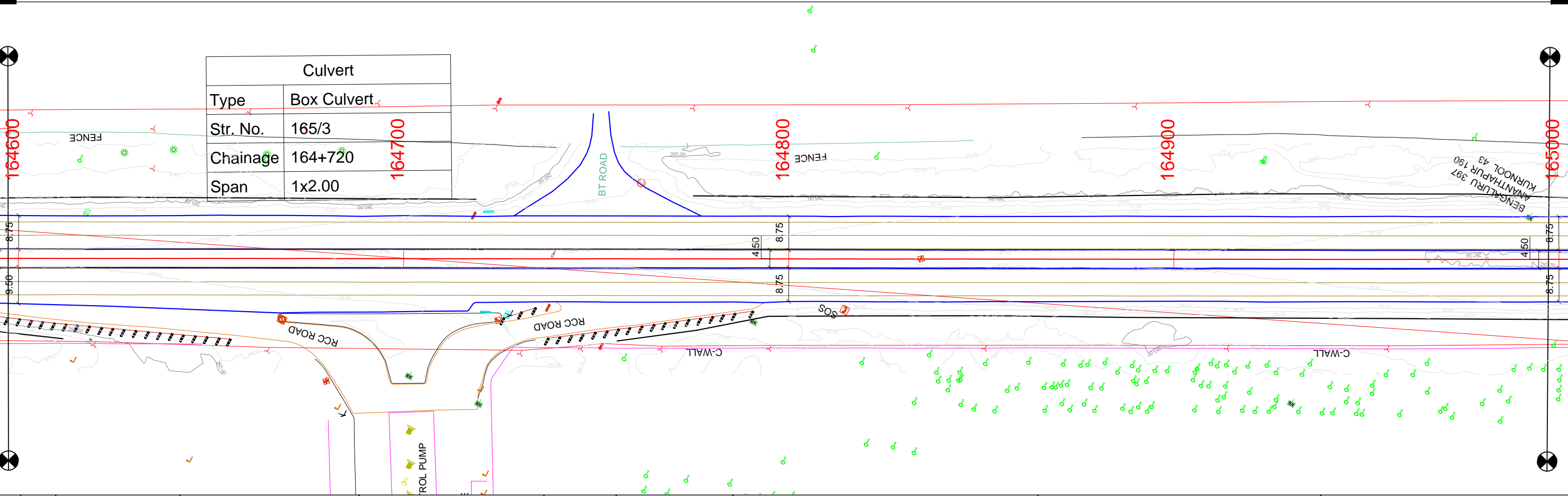
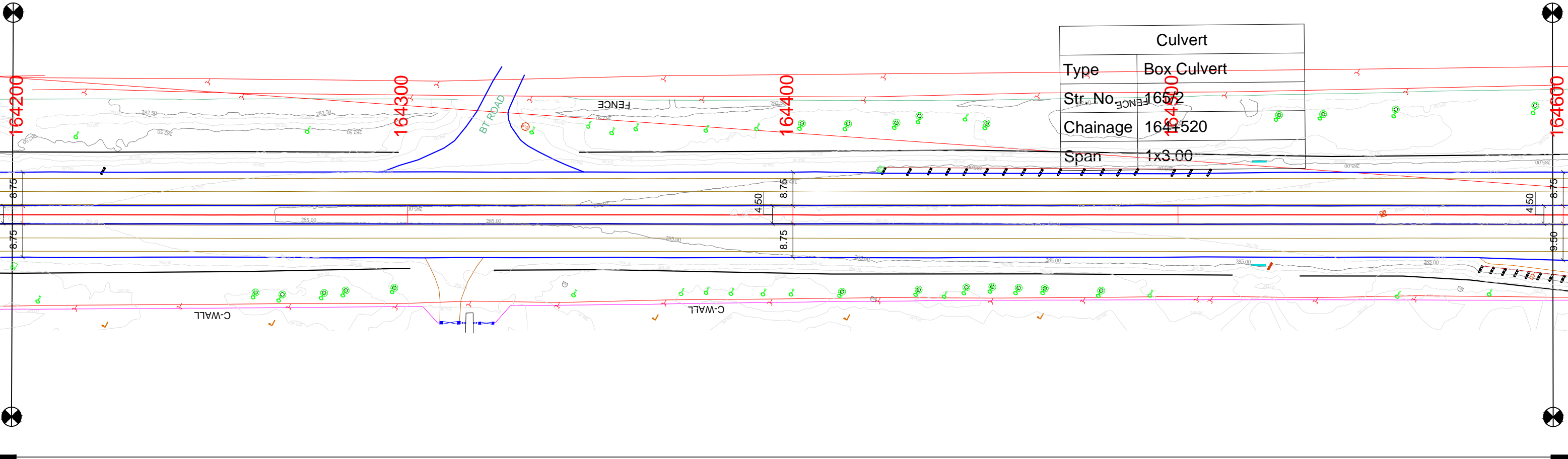
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**  




PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 163/400 TO 164/200			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
36	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS


CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

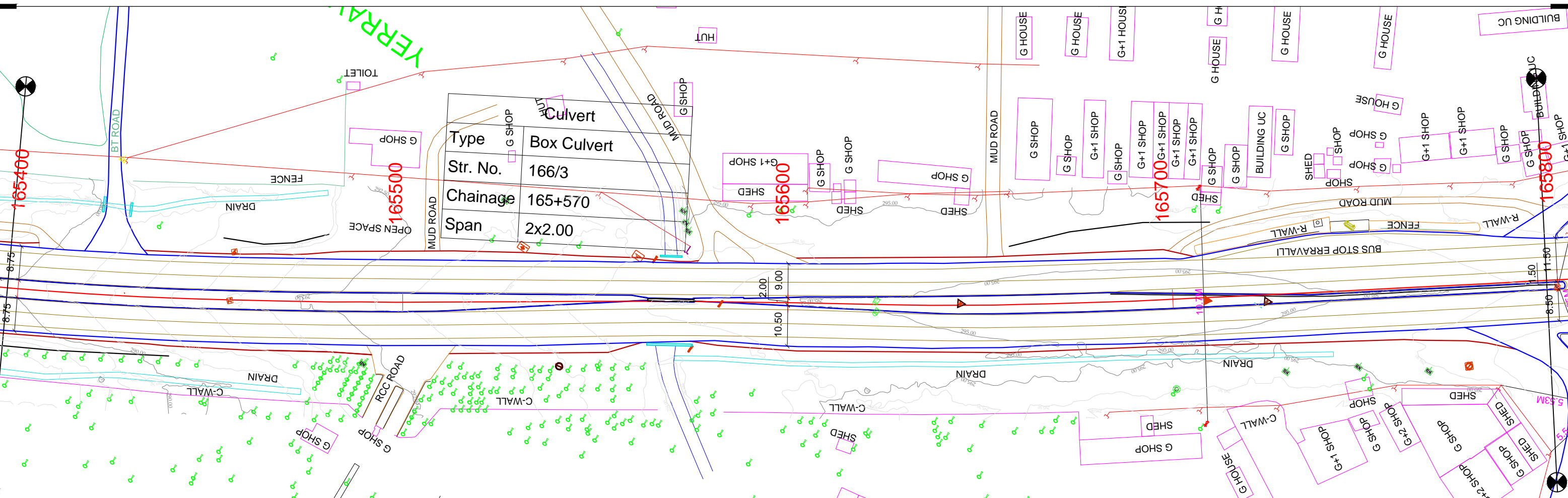
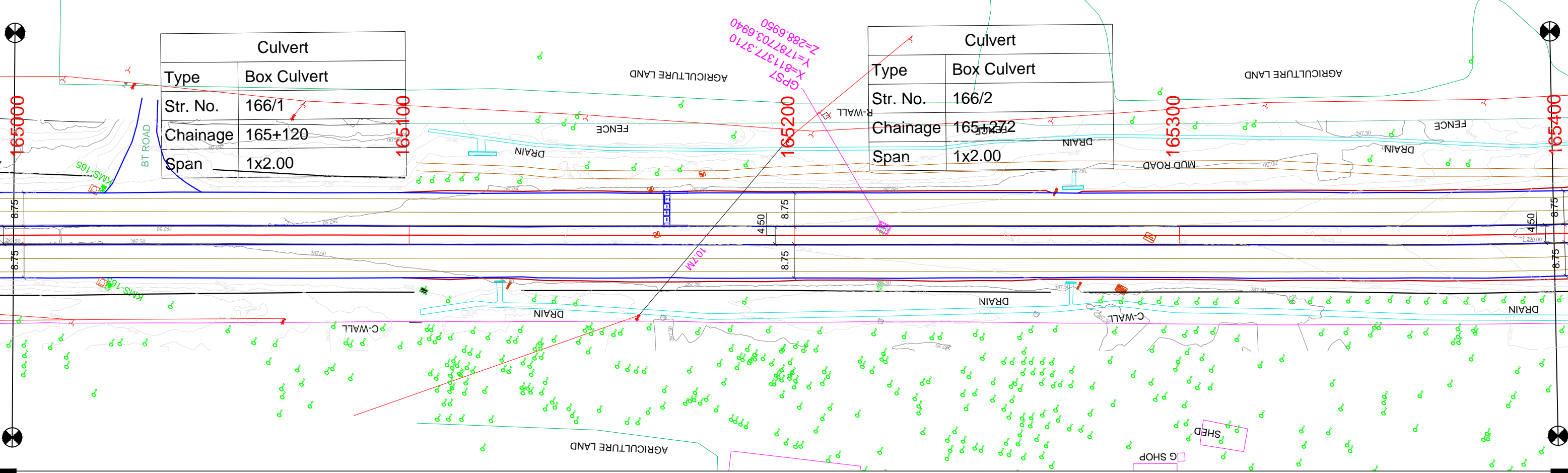





PROJECT :-

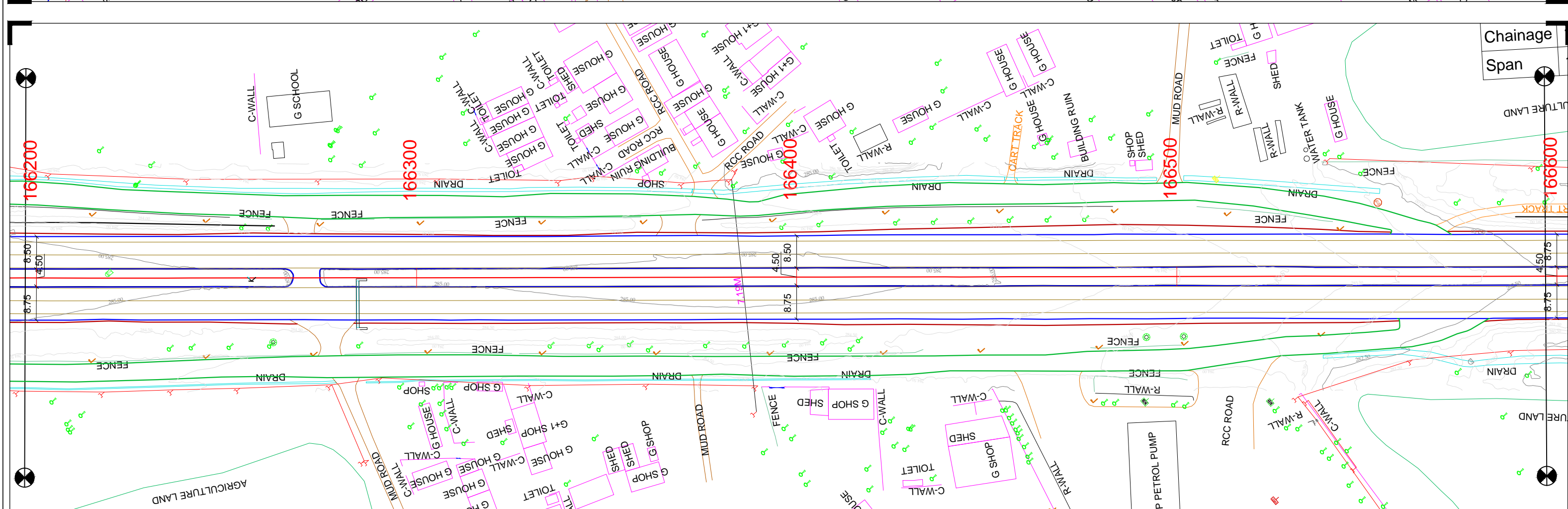
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 164/200 TO 165/000			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
37	1 : 1000	A3	0

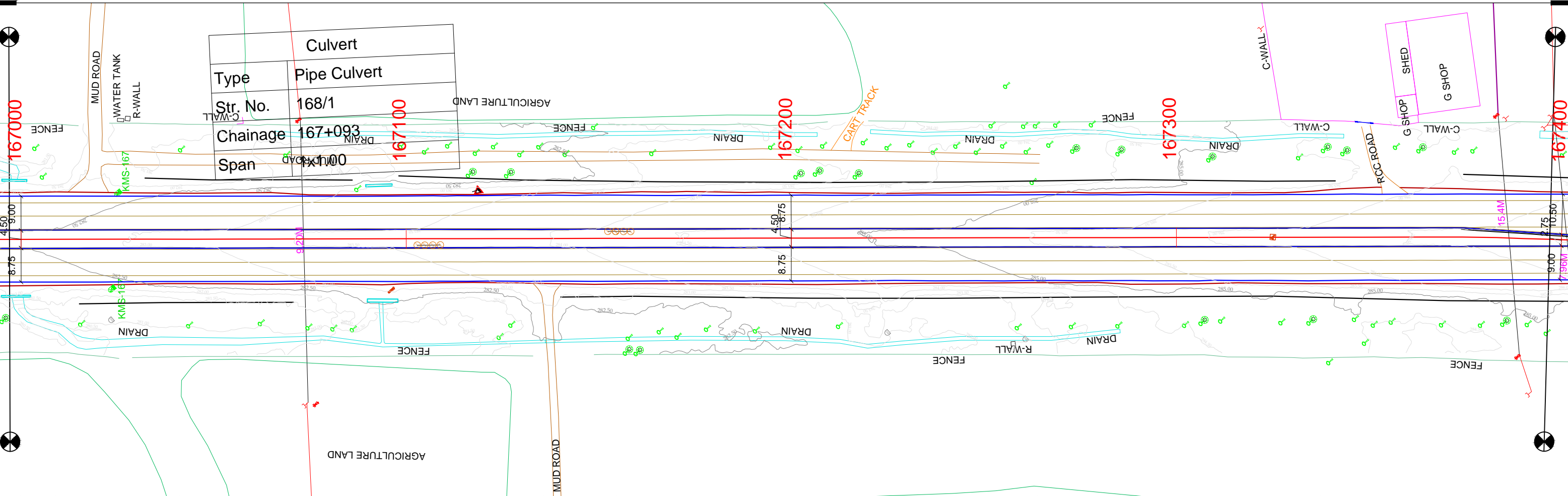
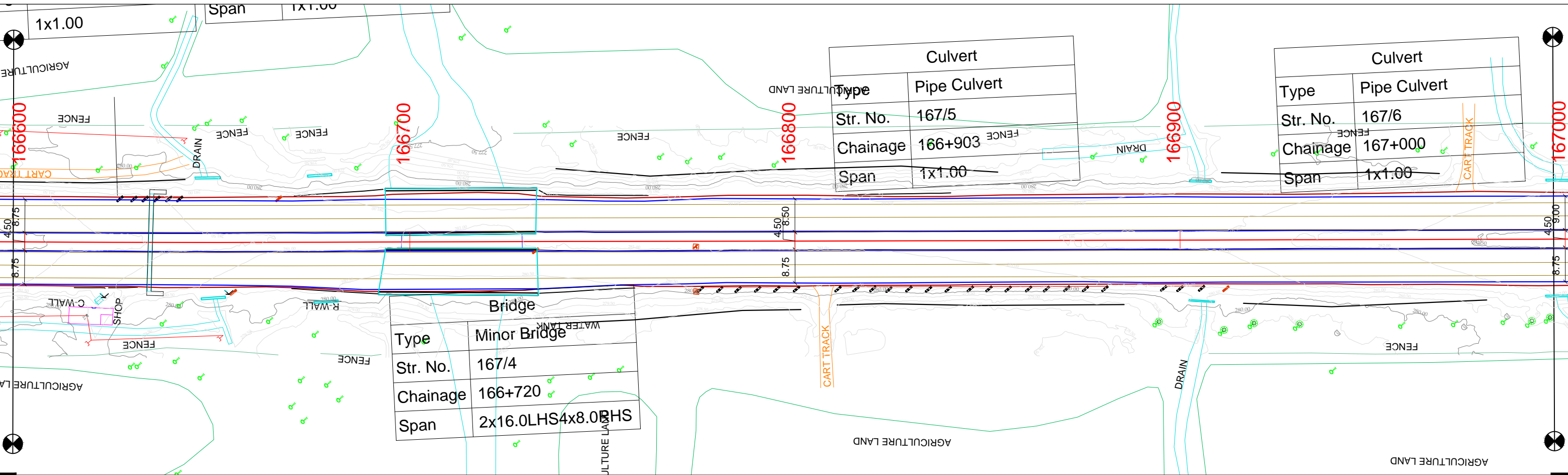






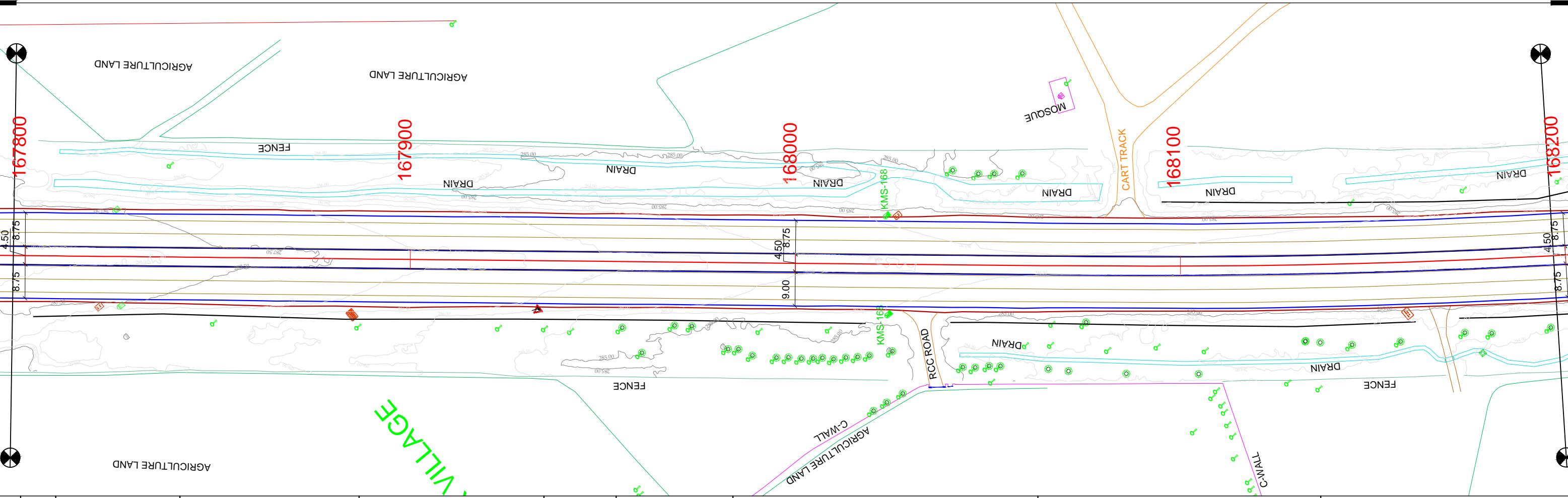
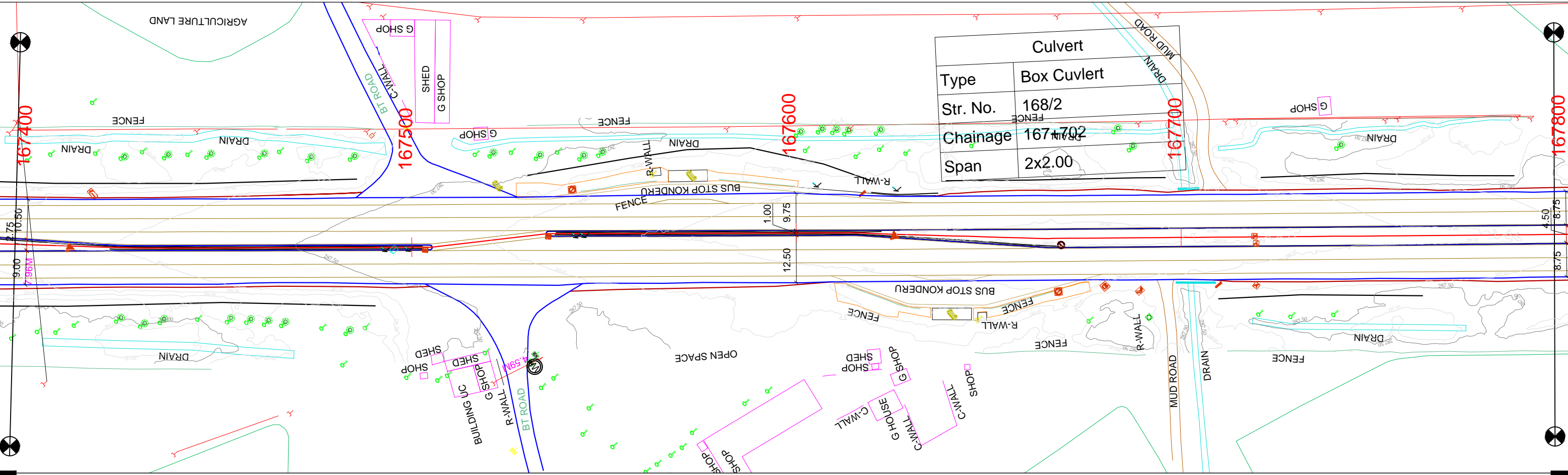
			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 165/000 TO 165/800				
				DESIGN BY					DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY					SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY					38 1 : 1000 A3 0			

6376





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYPISA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 166/600 TO 167/400			
				DESIGN BY				DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				40	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS


CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

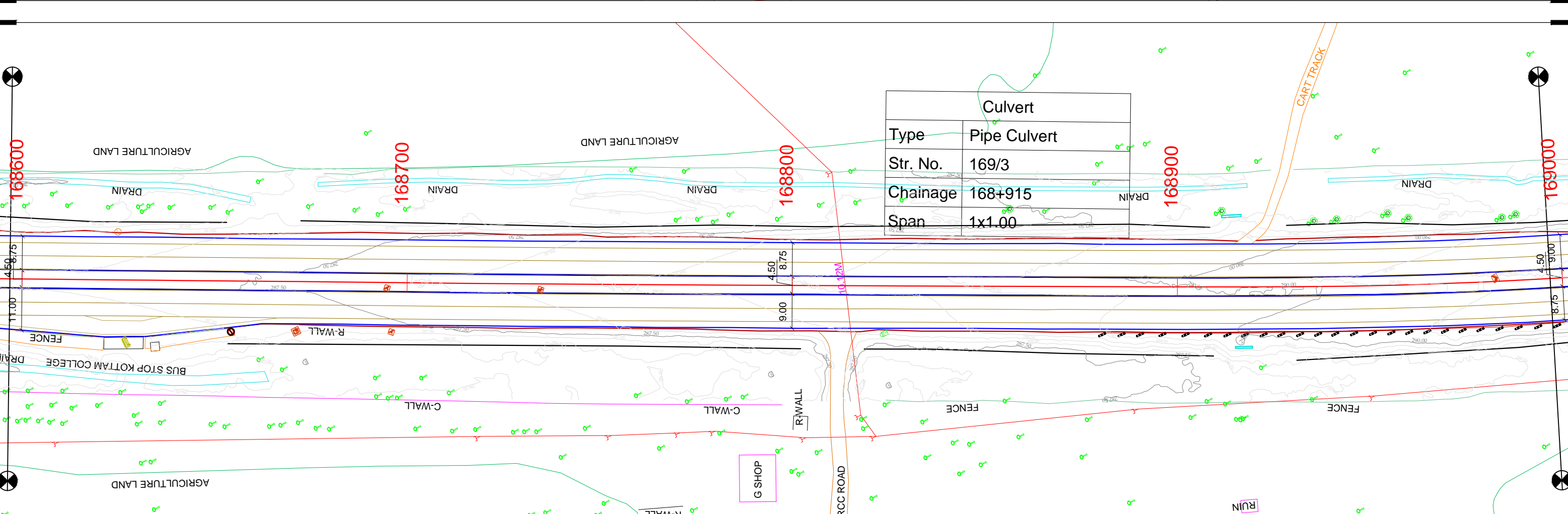
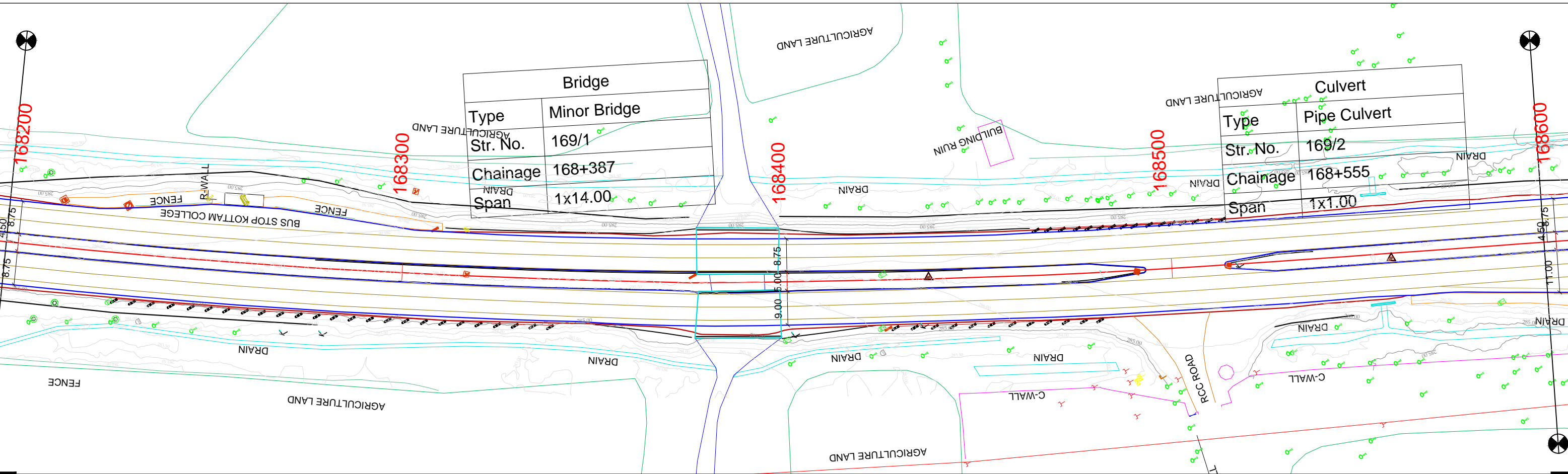
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	




CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**

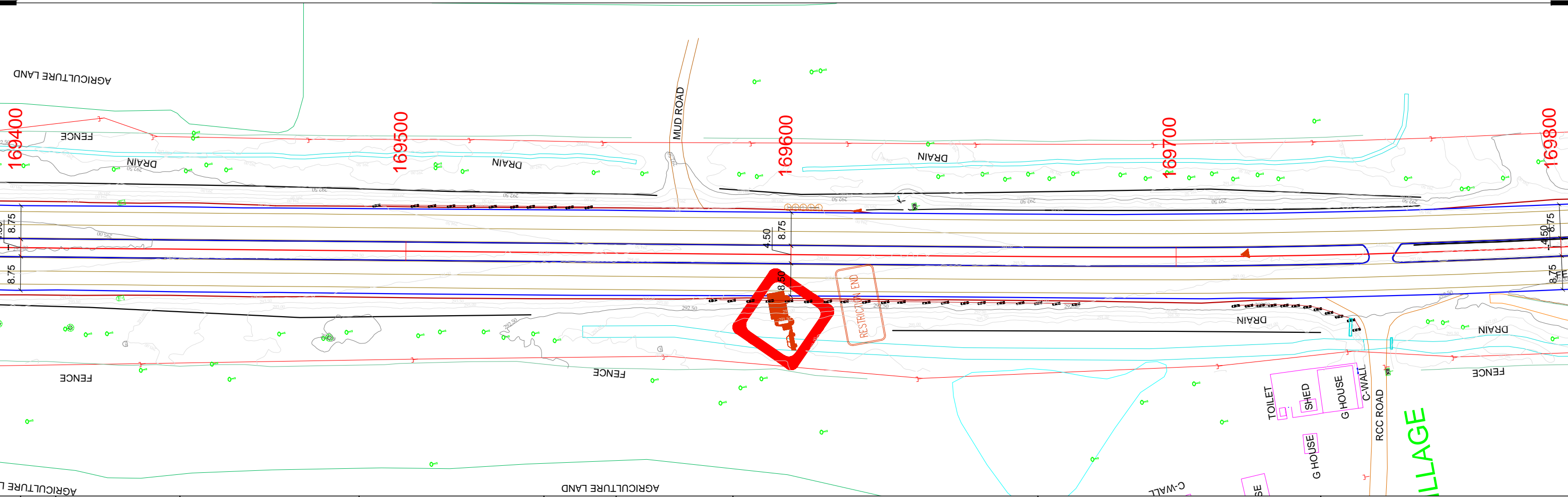
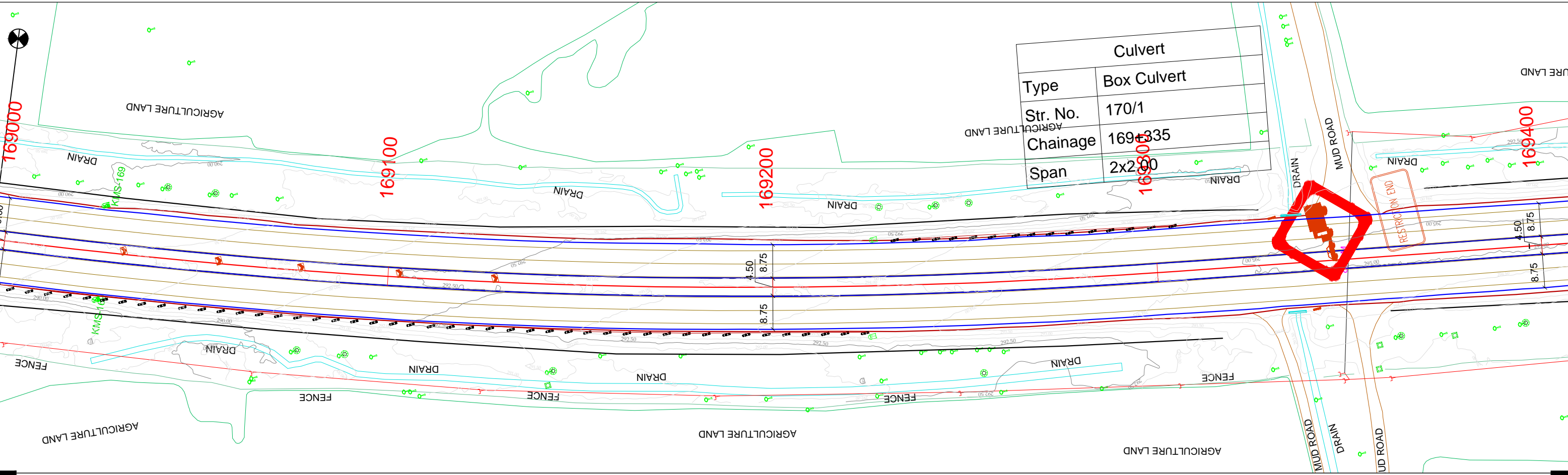
PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:-		KMS 167/400 TO 168/200	
DRAWING NO.		AV_TYPSA/NHAI/InvIT/TOPO_S	
SHEET NO.	SCALE	SIZE	REV
41	1 : 1000	A3	0






			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYPISA in JV with AVANZA Engineering Pvt. Ltd.  </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 168/200 TO 169/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS							SIZE		
						42	1 : 1000	A3	0		



REV	DATE	DESCRIPTION OF REVISIONS


CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

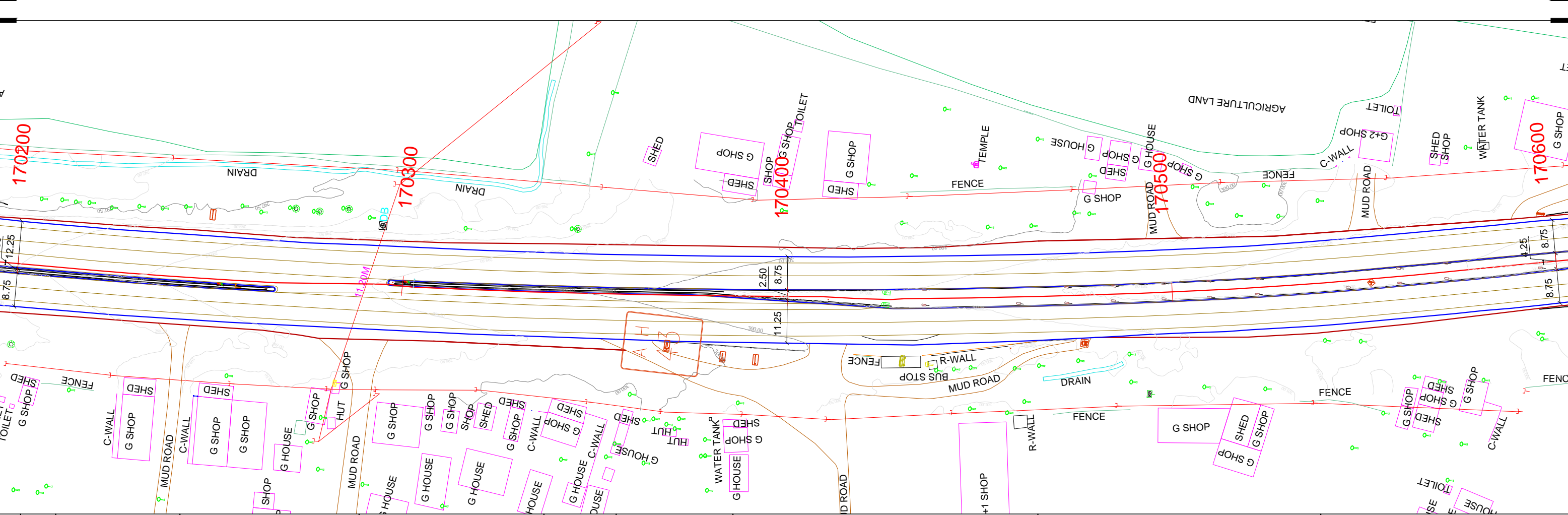
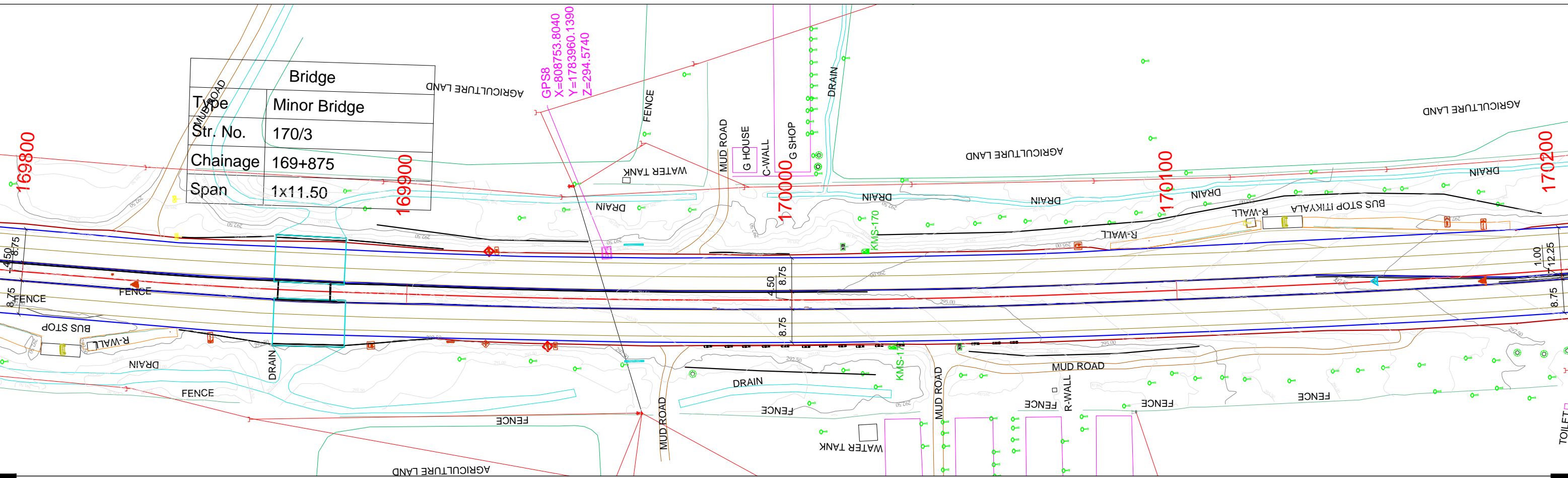
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**  


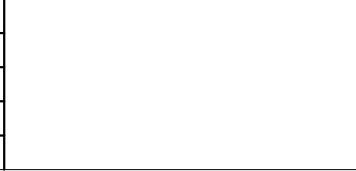
PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 169/000 TO 169/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
43	1 : 1000	A3	0





REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

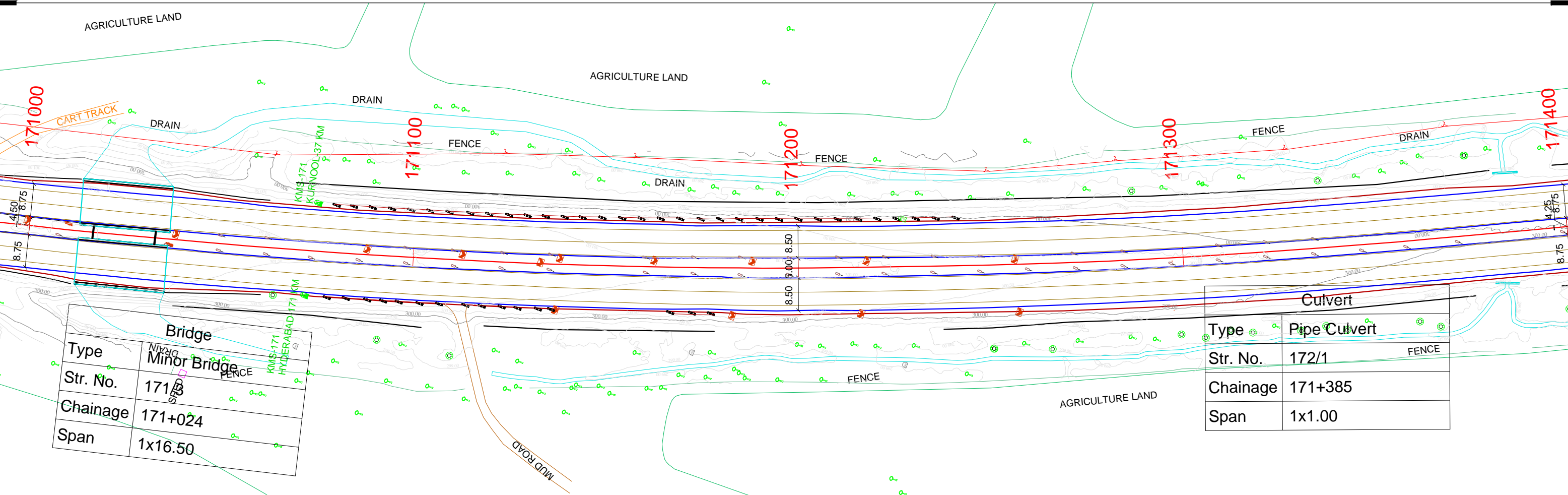
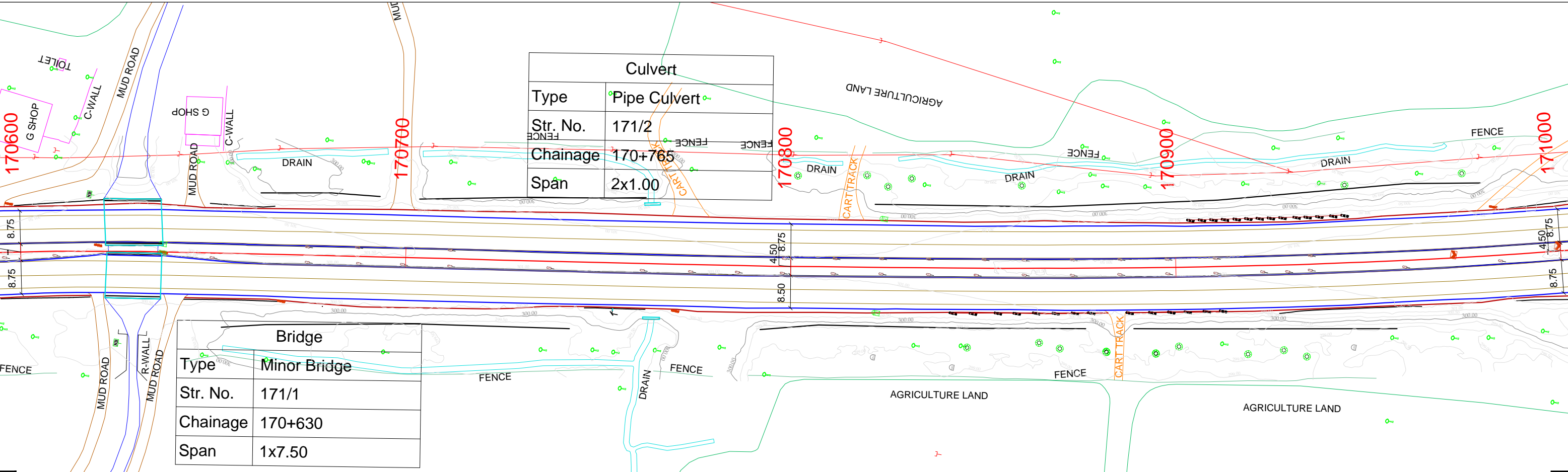
CONSULTANT:-  
**TYPESA in JV with  
AVANZA Engineering Pvt. Ltd.**



PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 169/800 TO 170/600			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
44	1 : 1000	A3	0





REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

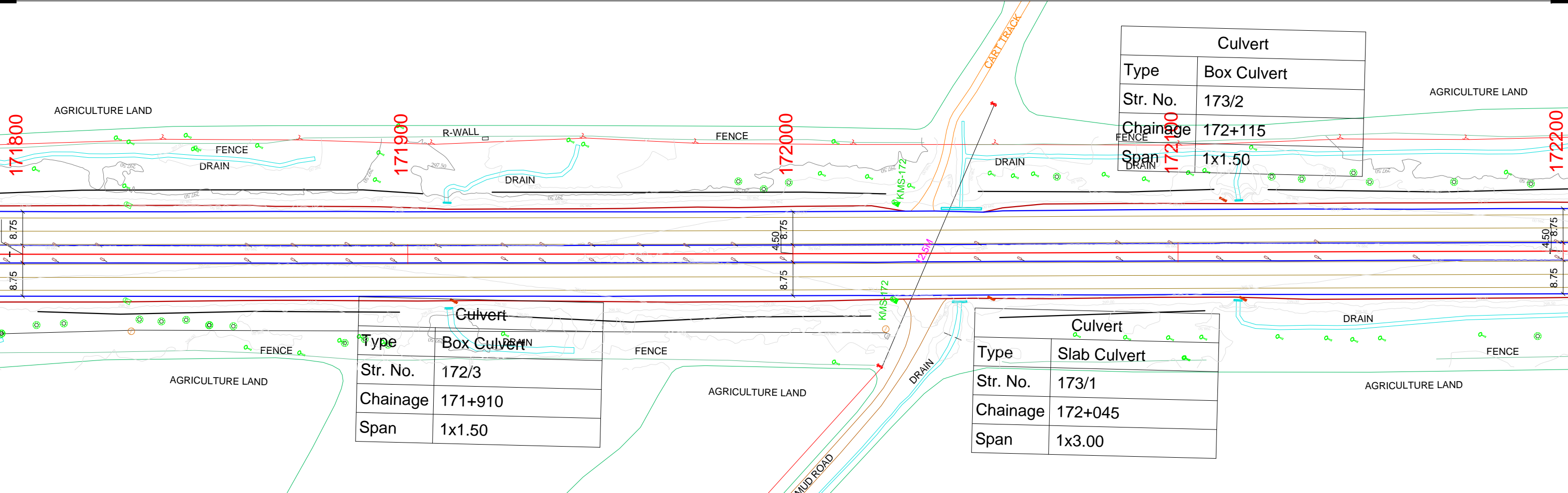
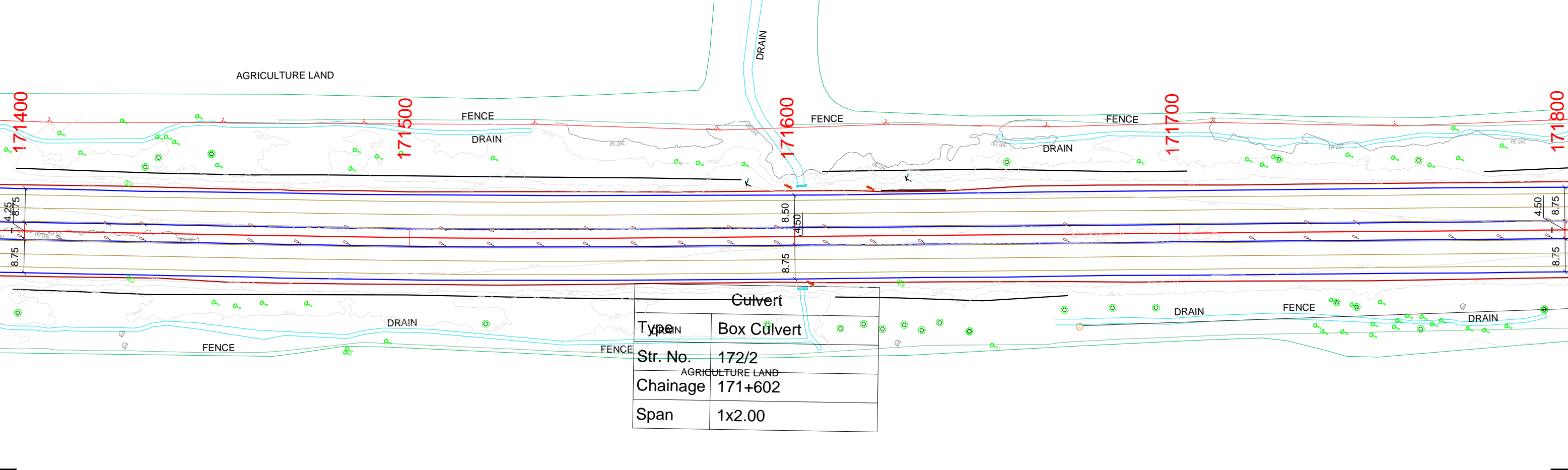
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

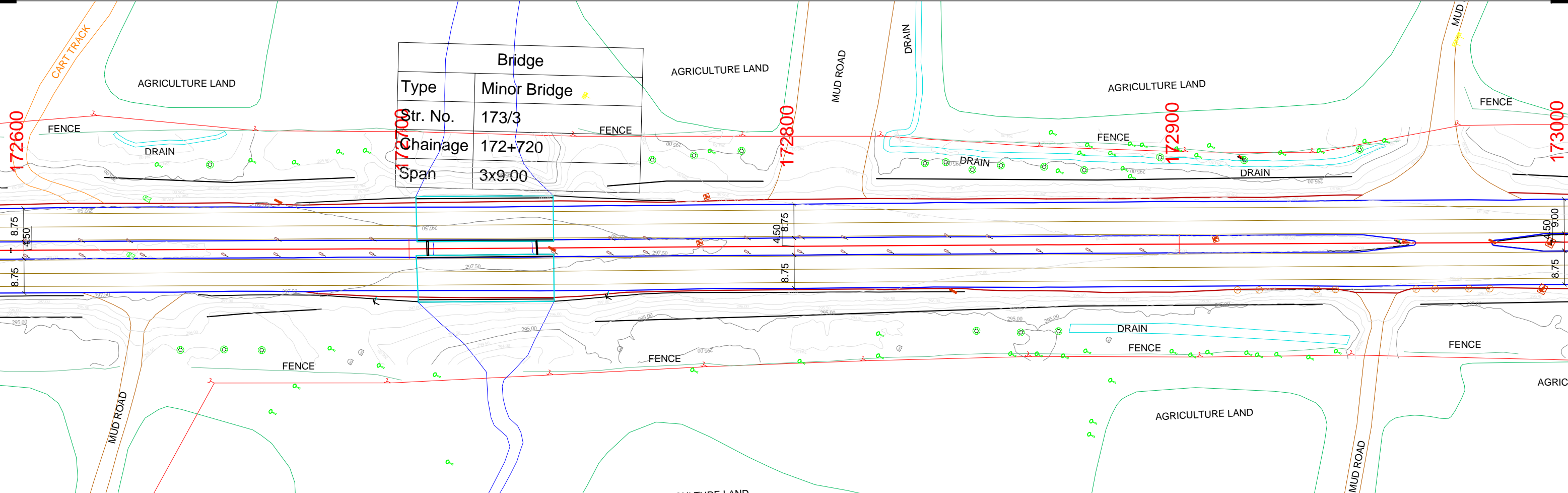
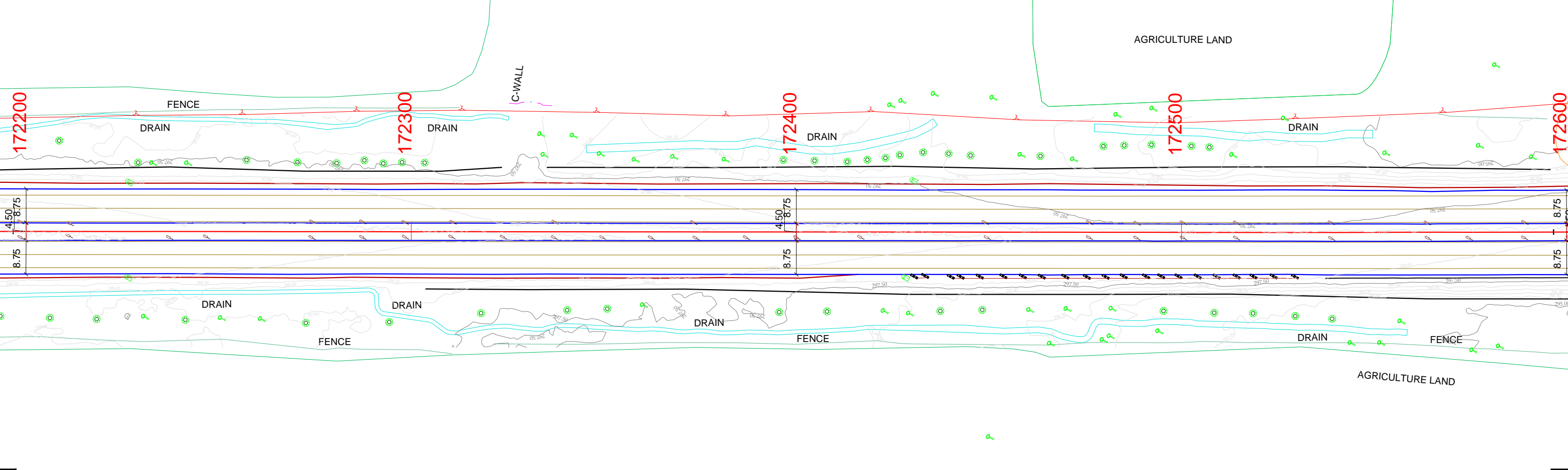
PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:-		KMS 170/600 TO 171/400	
DRAWING NO.		AV_TYPSA/NHAI/InvIT/TOPO_S	
SHEET NO.	SCALE	SIZE	REV
45	1 : 1000	A3	0







Bridge	
Type	Minor Bridge
Str. No.	173/3
Chainage	172+720
Span	3x9.00

REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-





NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

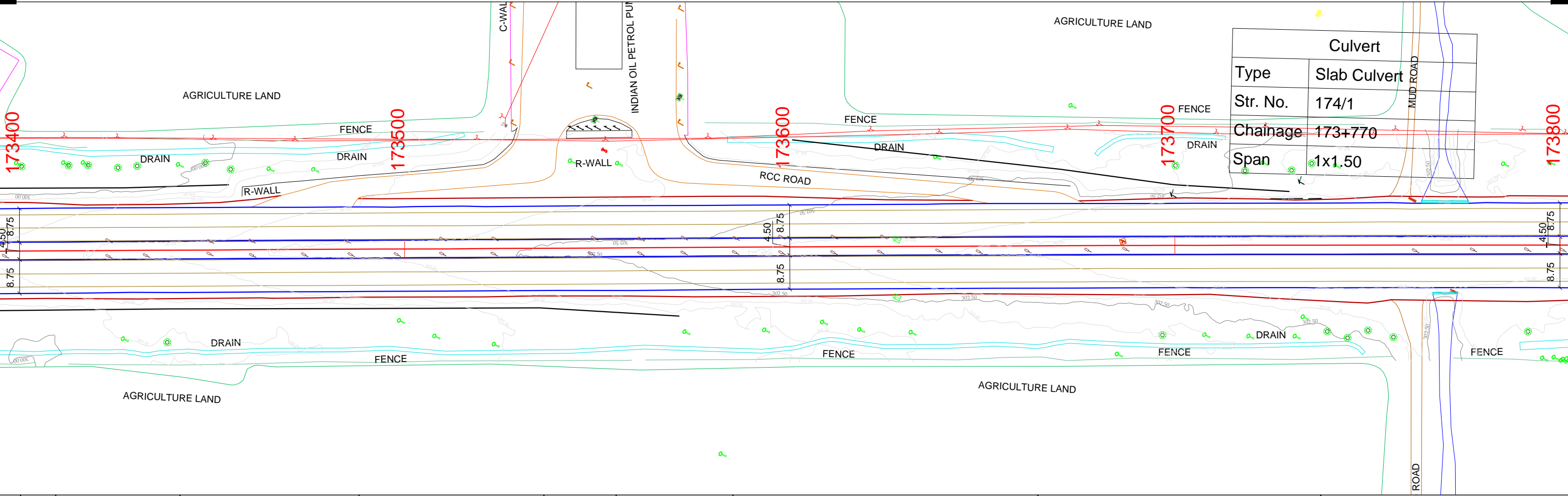
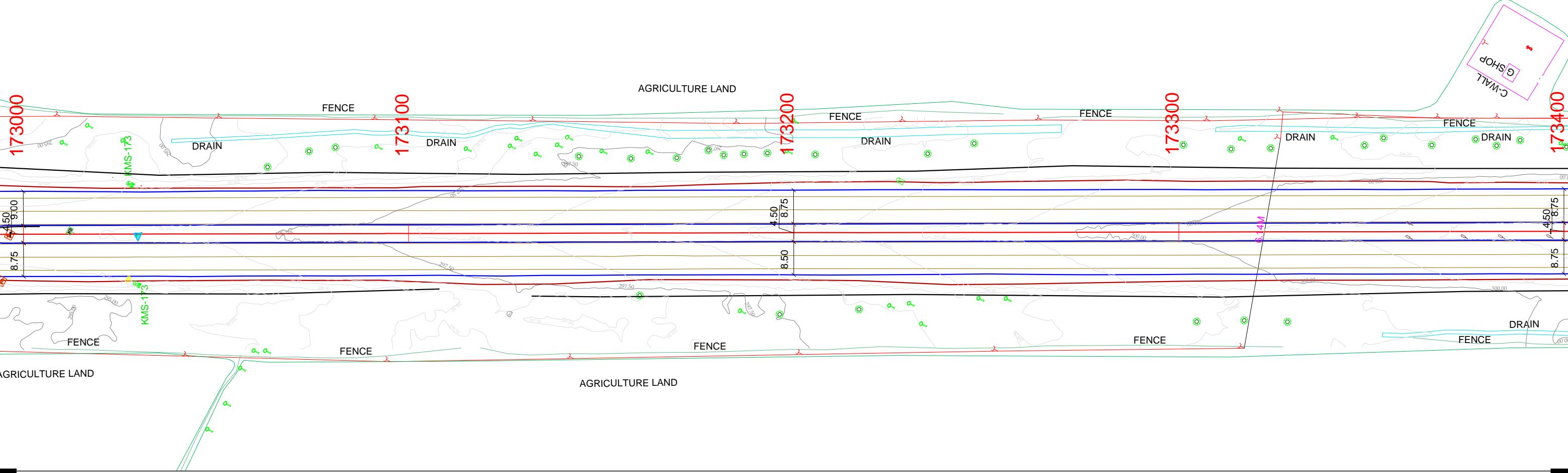
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.





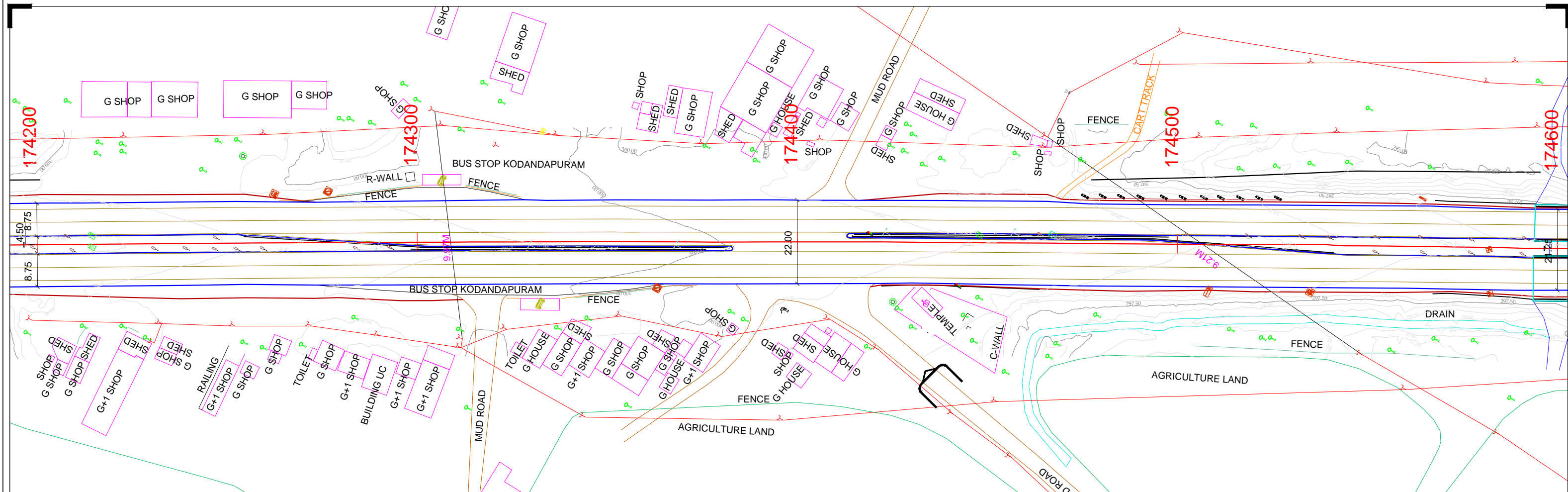
PROJECT :-




Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 172/200 TO 173/000			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
47	1 : 1000	A3	0



			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	<div>DRAWN BY DESIGN BY CHECKED BY APPROVED BY</div>	<div>CONSULTANT:- TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 173/000 TO 173/800			
							DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS					SHEET NO.	SCALE	SIZE	REV
							48	1 : 1000	A3	0



			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYP SA in JV with AVANZA Engineering Pvt. Ltd.  </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 173/800 TO 174/600				
				DESIGN BY					DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_5			
				CHECKED BY					SHEET NO. SCALE SIZE REV			
				APPROVED BY					49 1 : 1000 A3 0			
REV	DATE	DESCRIPTION OF REVISIONS										

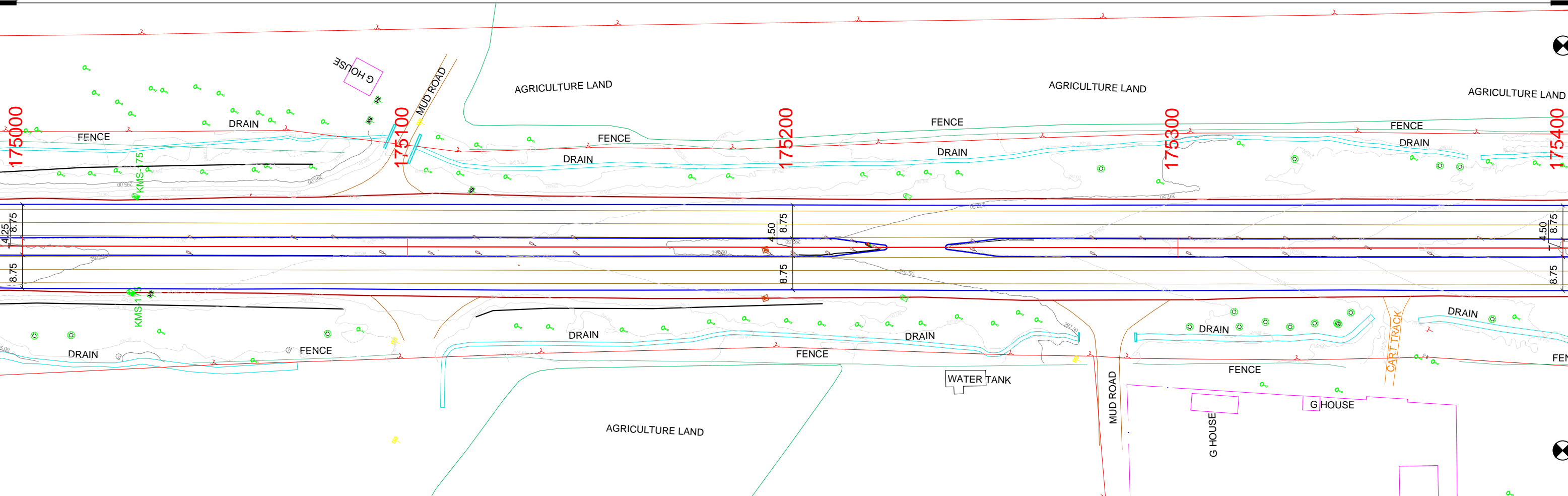
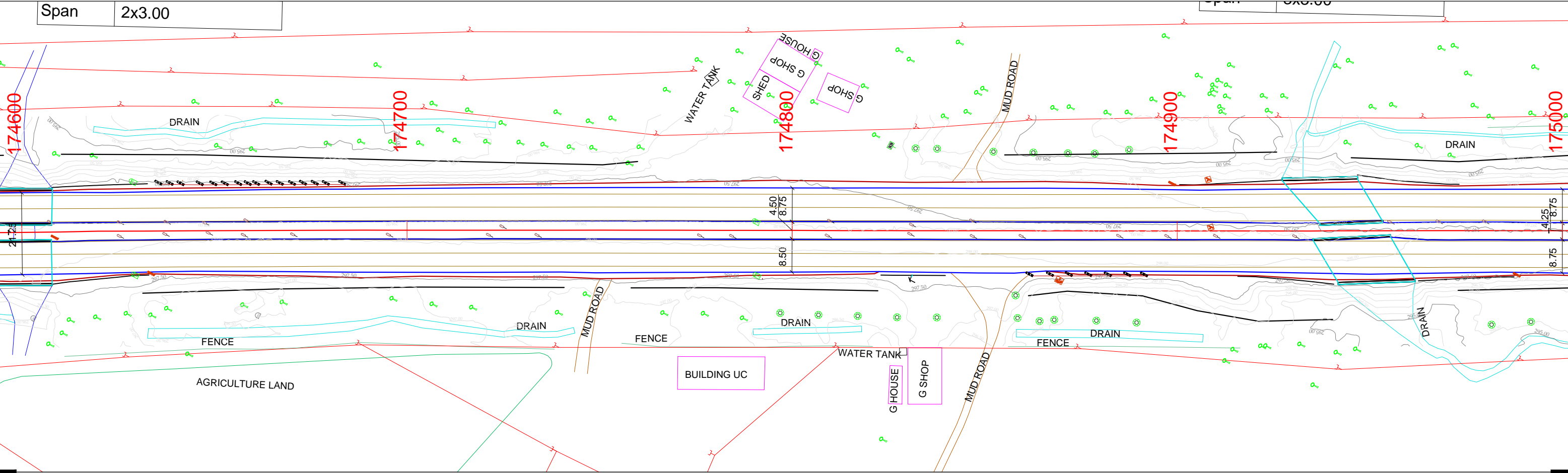


<<< TO KOTHAKOTA

(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>


Span 2x3.00



REV	DATE	DESCRIPTION OF REVISIONS

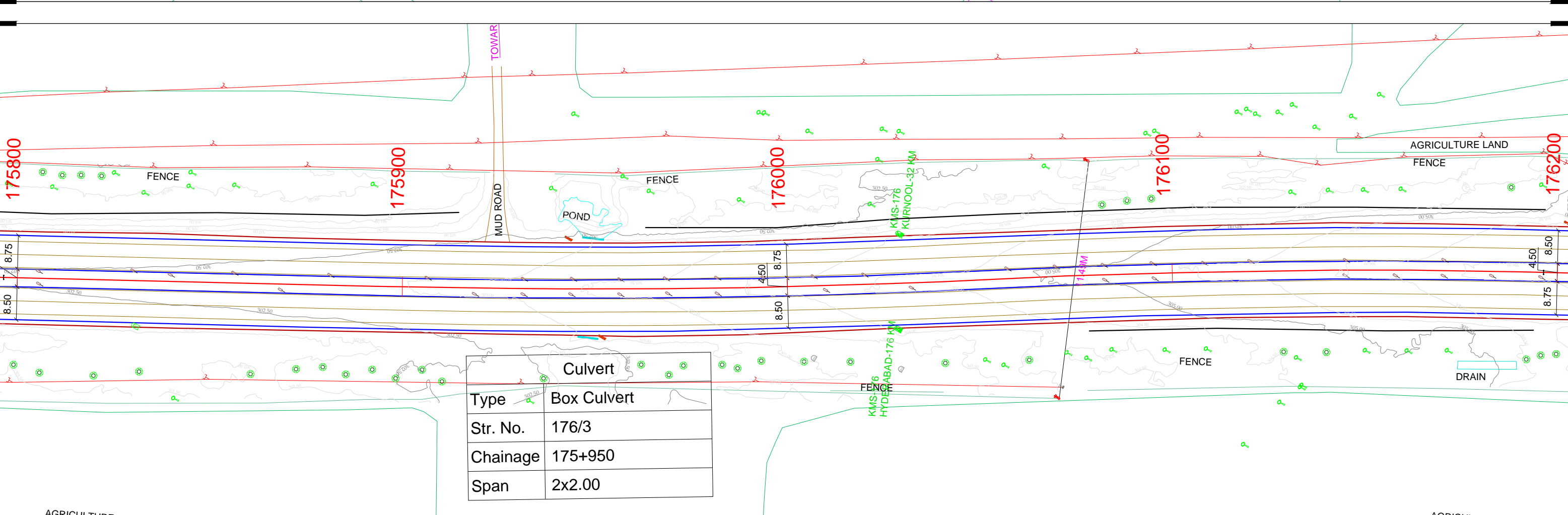
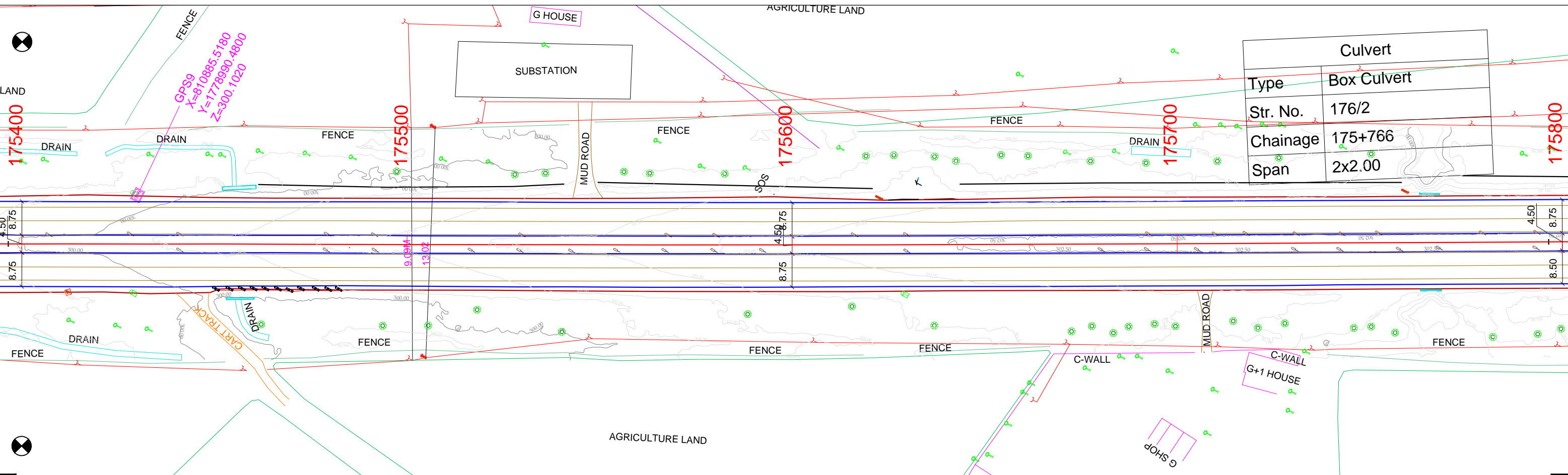
CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**



DRAWN BY  
DESIGN BY  
CHECKED BY  
APPROVED BY

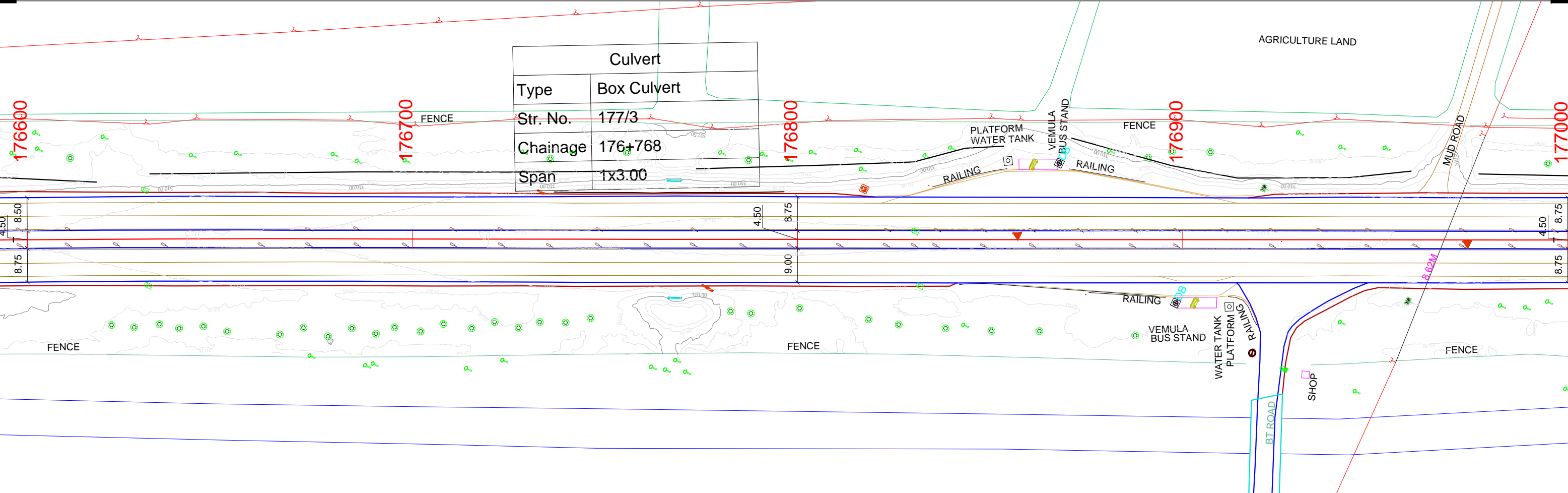
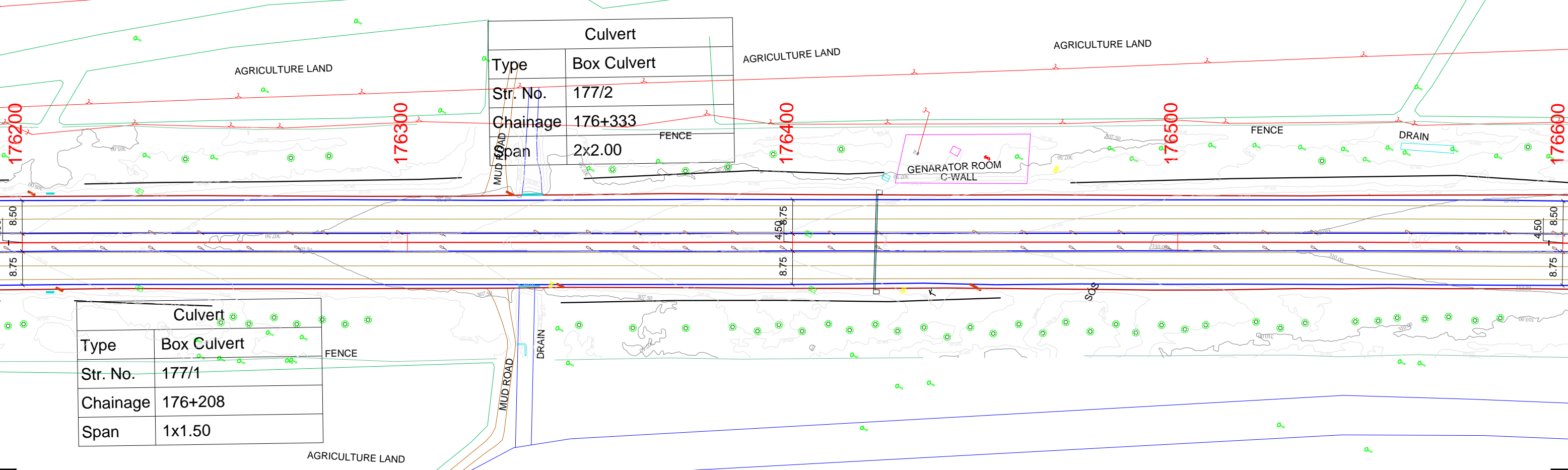
CONSULTANT:-  
**TYPESA in JV with  
AVANZA Engineering Pvt. Ltd.**  


PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

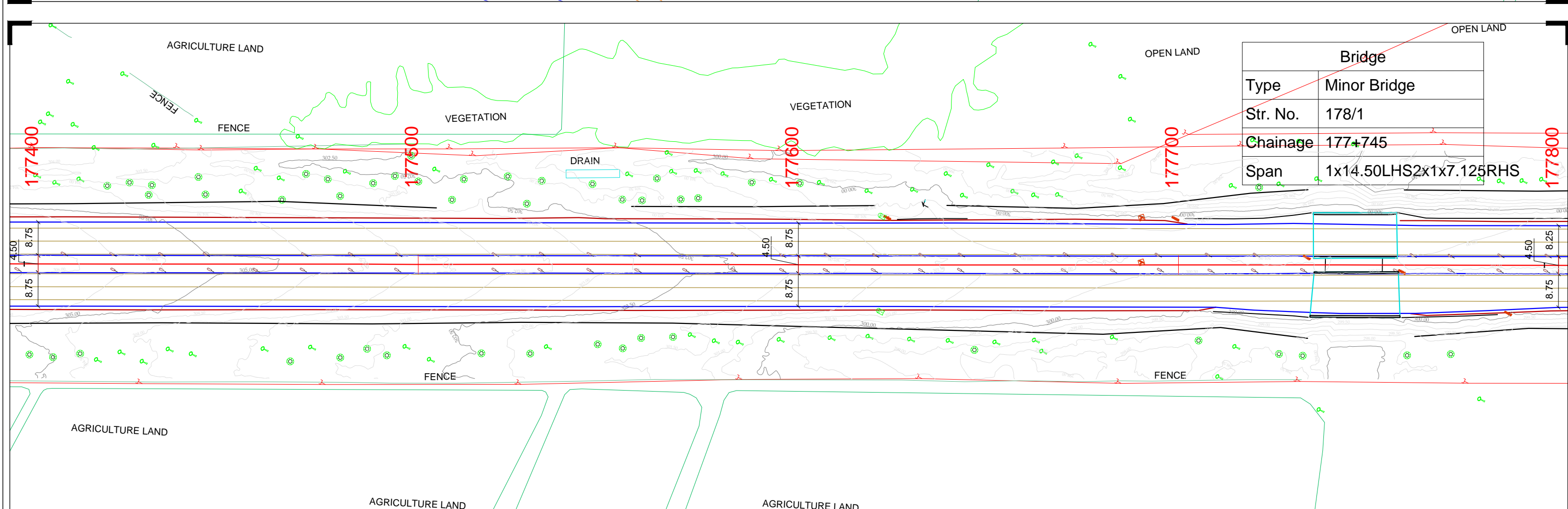
TITLE:- KMS 174/600 TO 175/400			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
50	1 : 1000	A3	0






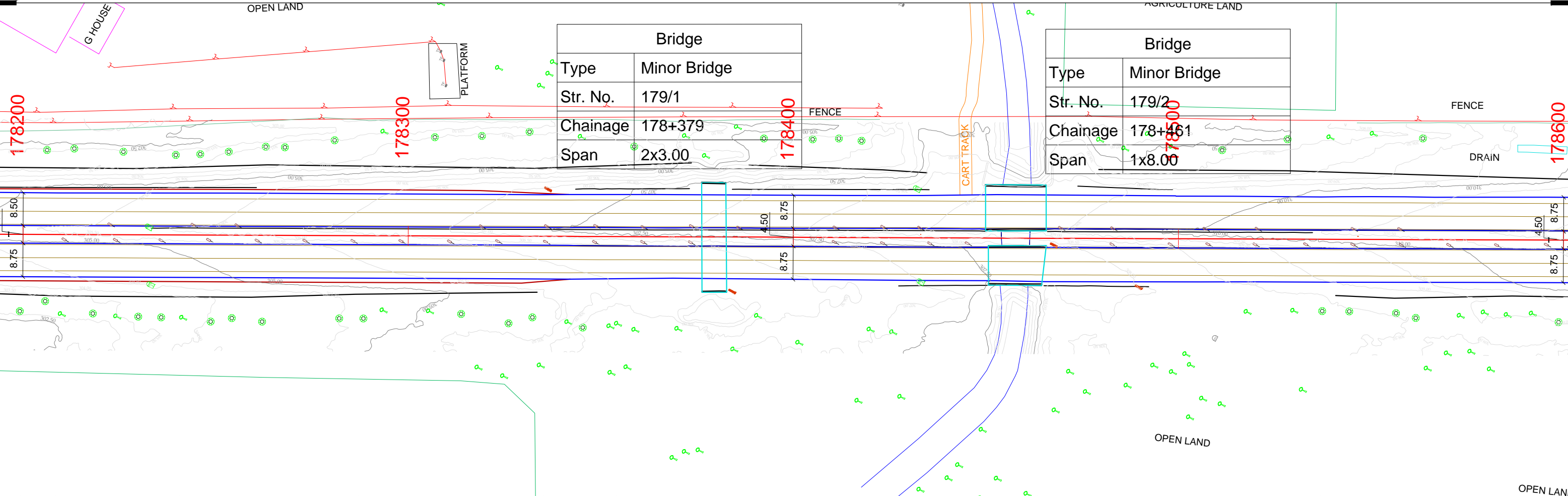
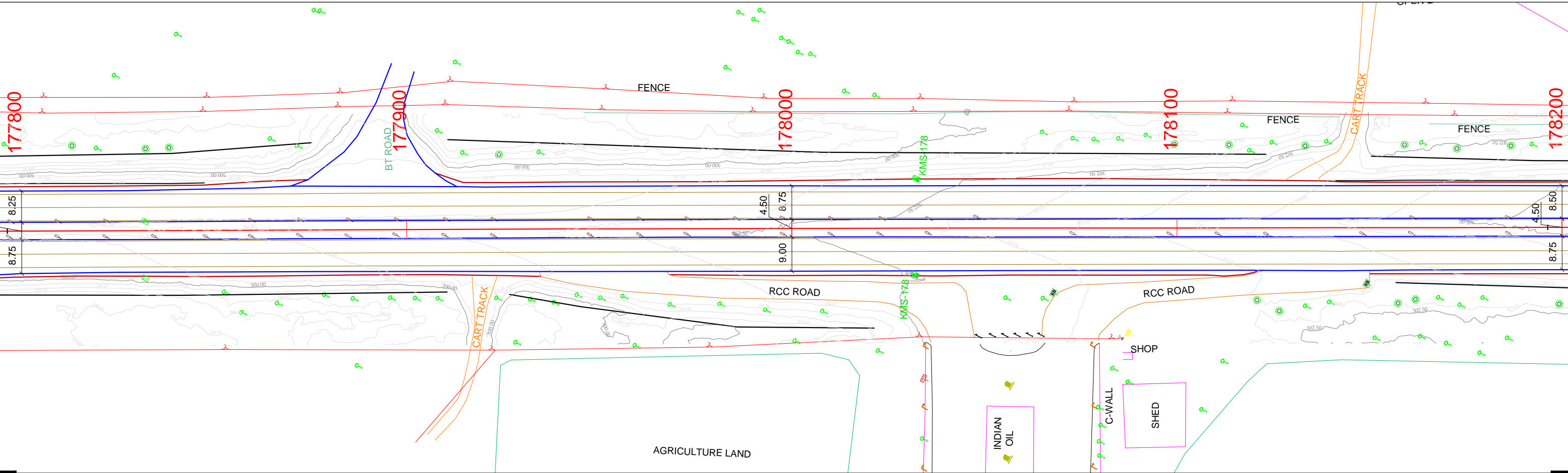
			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 175/400 TO 176/200			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				51 1 : 1000 A3 0			







			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 177/000 TO 177/800				
				DESIGN BY					DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_5			
				CHECKED BY					SHEET NO. SCALE SIZE REV			
				APPROVED BY					53 1 : 1000 A3 0			
REV	DATE	DESCRIPTION OF REVISIONS										



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

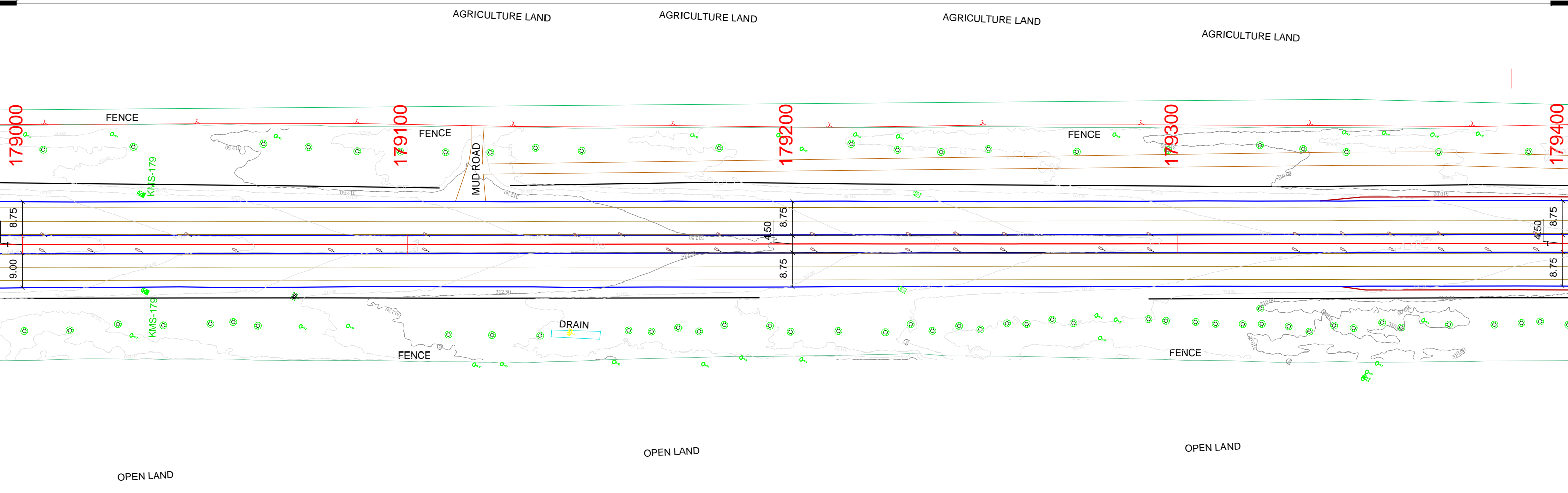
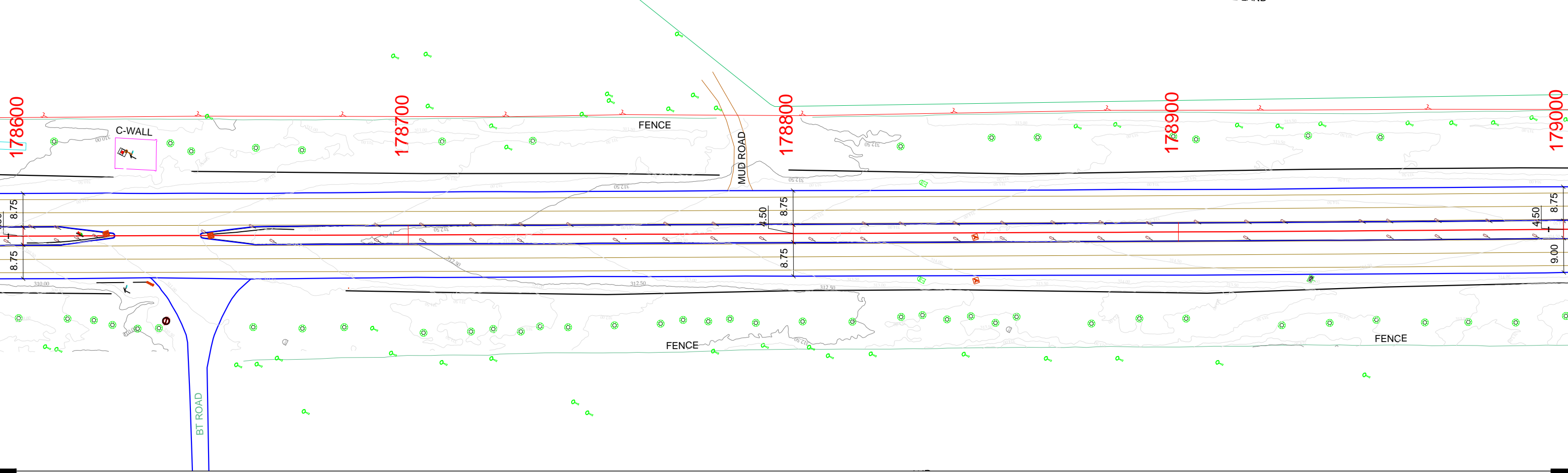
  




PROJECT :-

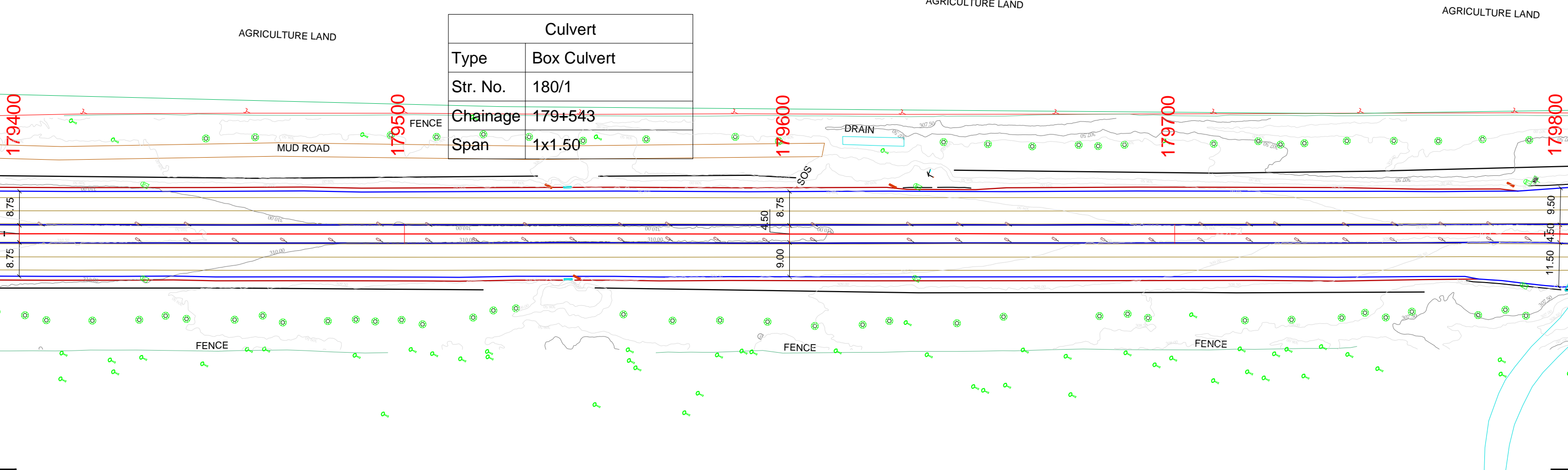
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:- KMS 177/800 TO 178/600			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
54	1 : 1000	A3	0





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 178/600 TO 179/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
				APPROVED BY				55	1 : 1000	A3	0
REV	DATE	DESCRIPTION OF REVISIONS									



REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-





NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

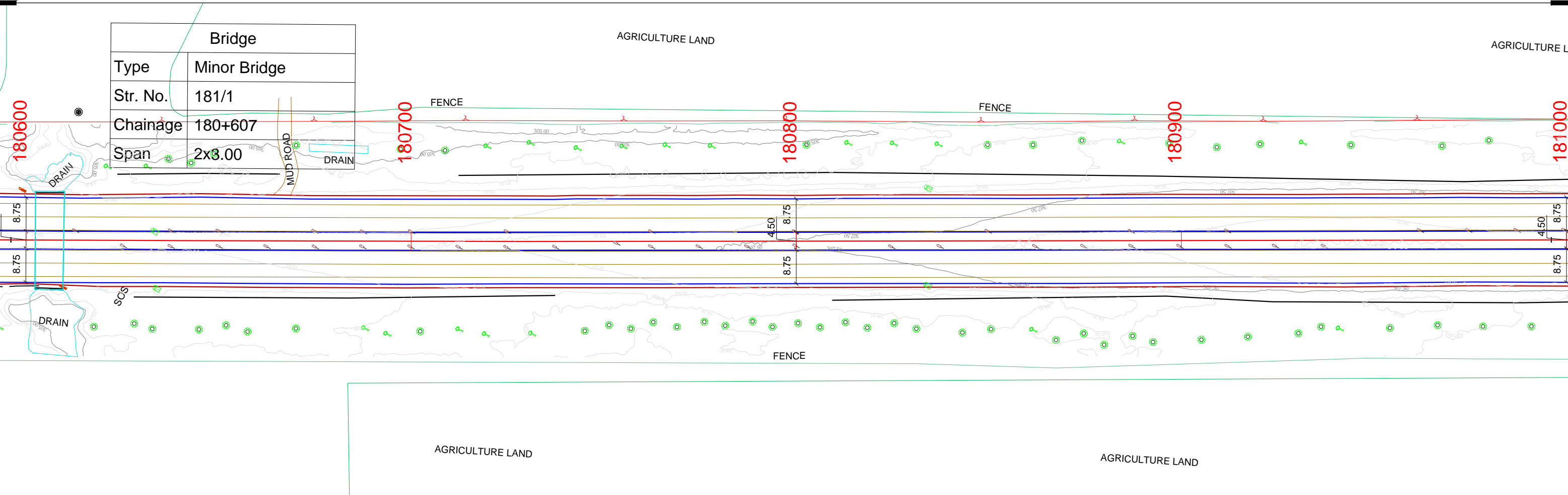
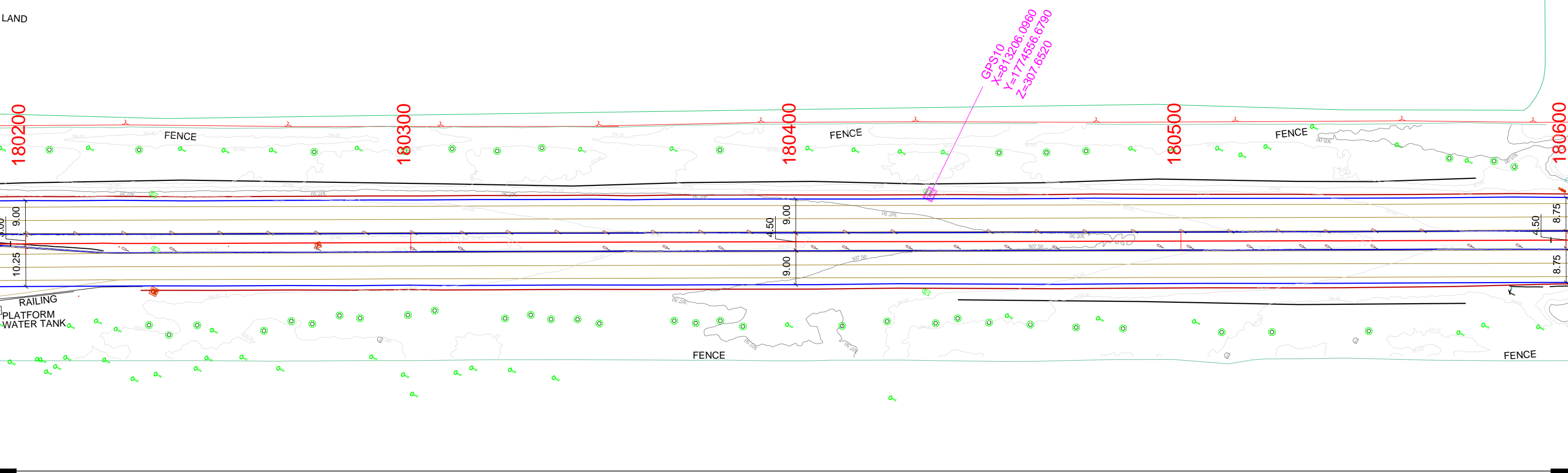
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.



PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:-		KMS 179/400 TO 180/200	
DRAWING NO.		AV_TYPSA/NHAI/InvIT/TOPO_S	
SHEET NO.	SCALE	SIZE	REV
56	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

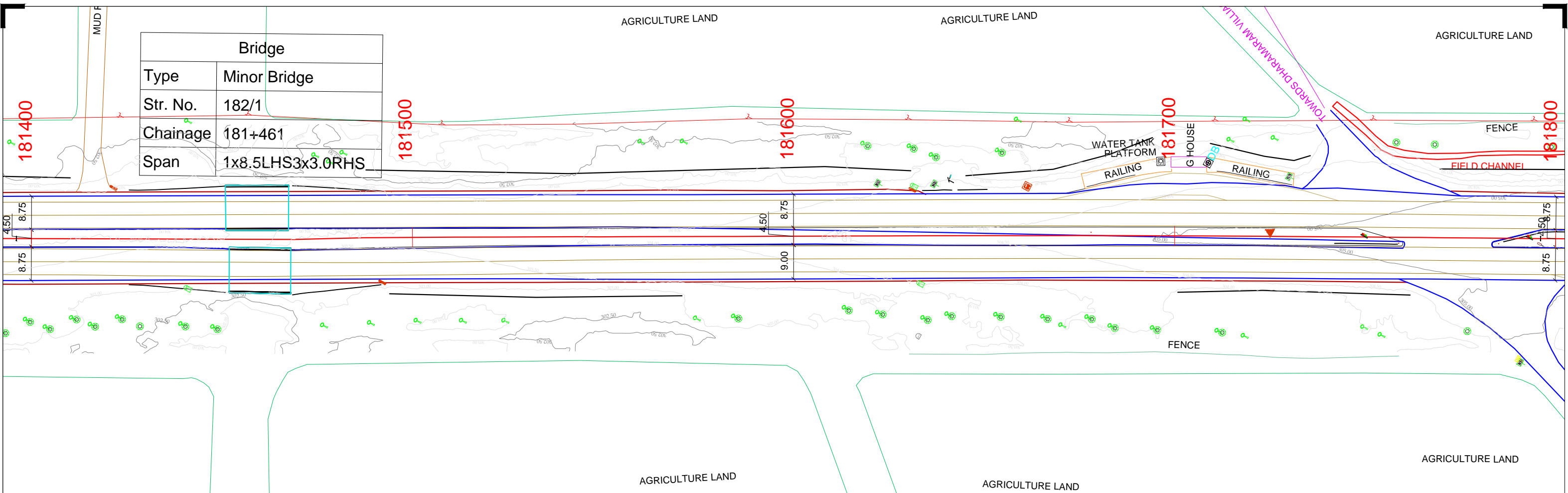
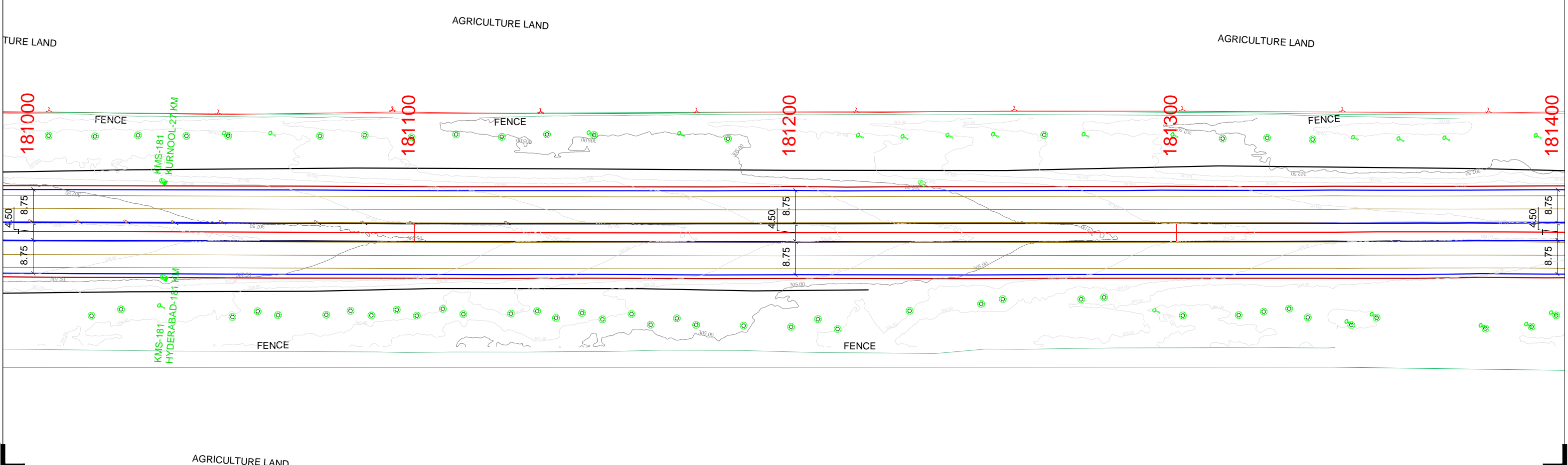
  


PROJECT :-



Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

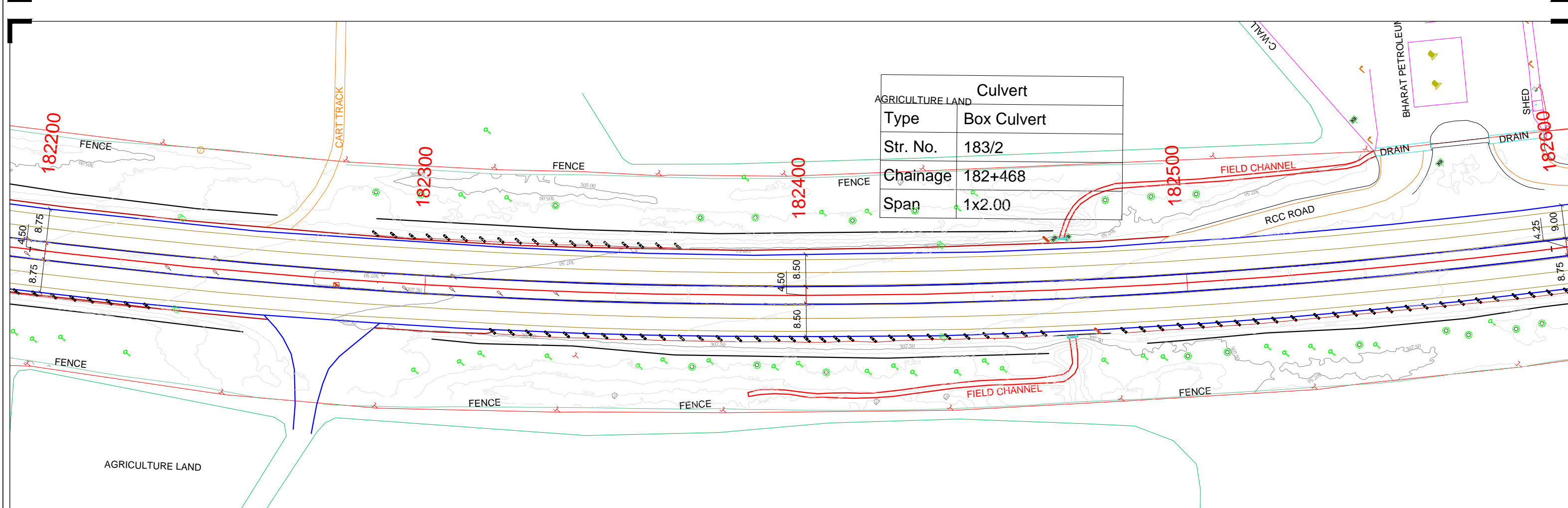
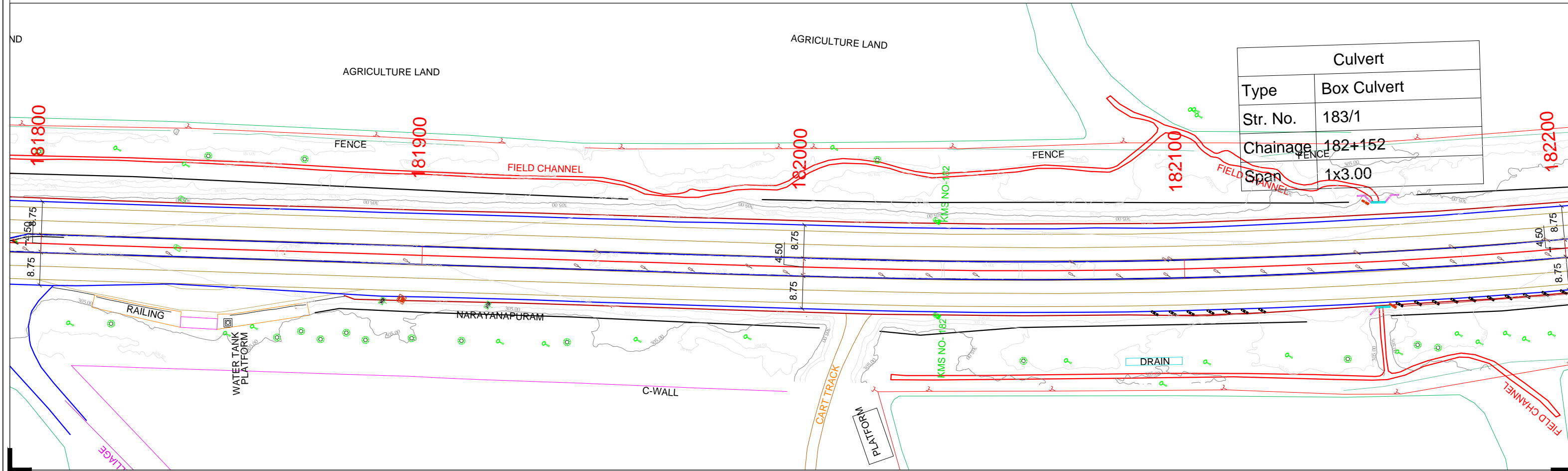
TITLE:-	KMS 180/200 TO 181/000			
DRAWING NO.	AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV	
57	1 : 1000	A3	0	







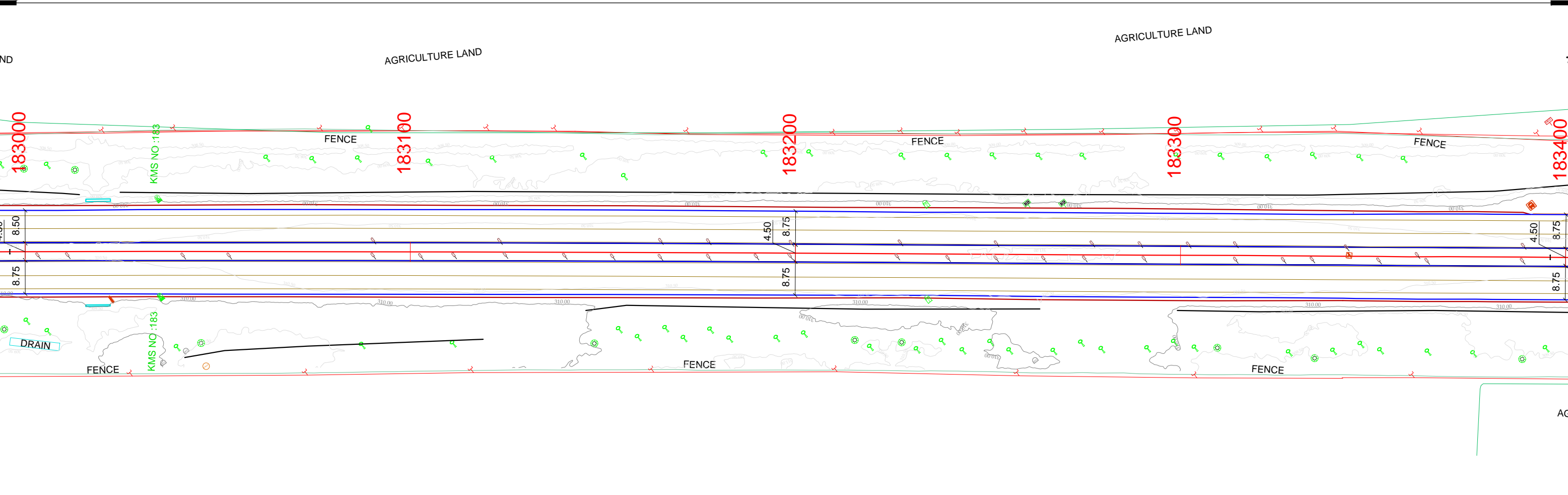
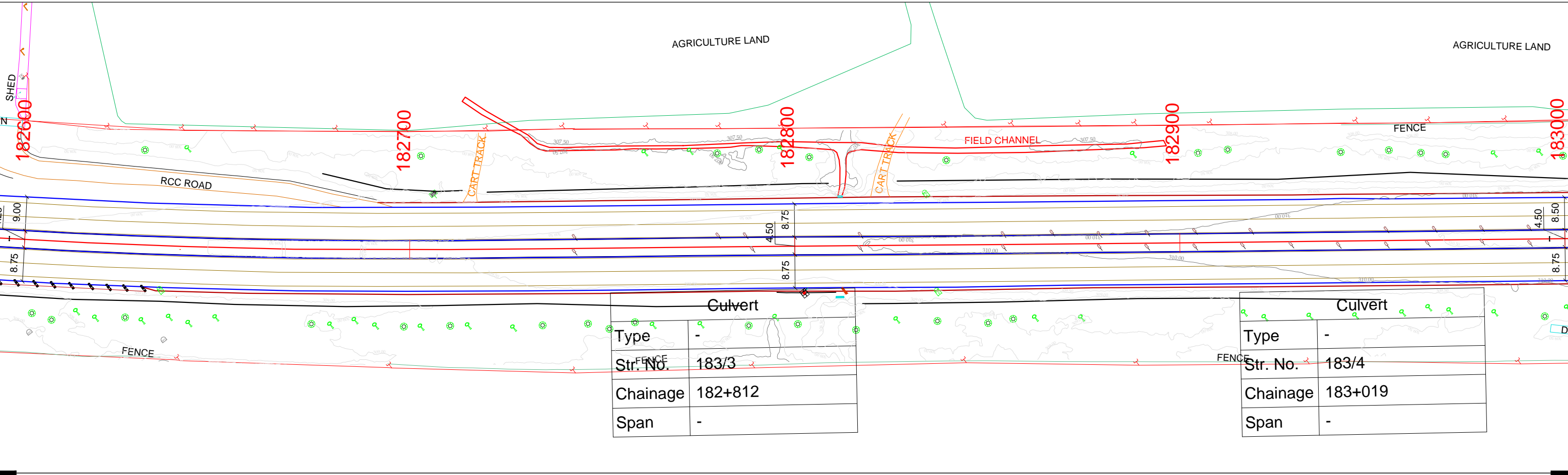
Bridge	
Type	Minor Bridge
Str. No.	182/1
Chainage	181+461
Span	1x8.5LHS3x3.0RHS



			CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA		DRAWN BY DESIGN BY CHECKED BY APPROVED BY		CONSULTANT:- TYPESA in JV with AVANZA Engineering Pvt. Ltd. 		PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model				TITLE:- KMS 181/000 TO 181/800			
													DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS											SHEET NO.	SCALE	SIZE	REV
													58	1 : 1000	A3	0

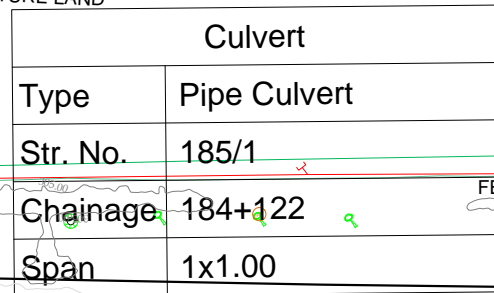
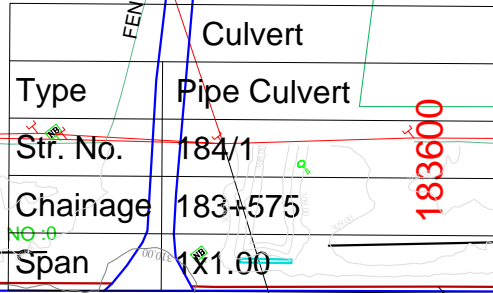


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 181/800 TO 182/600			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				59 1 : 1000 A3 0			





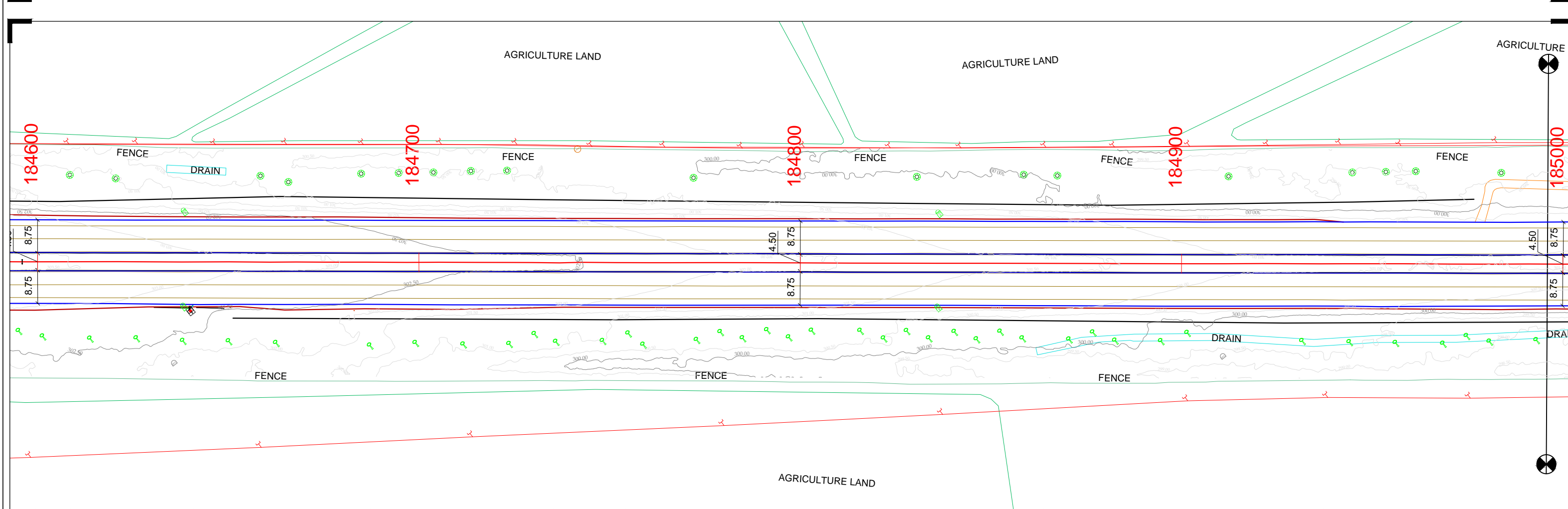
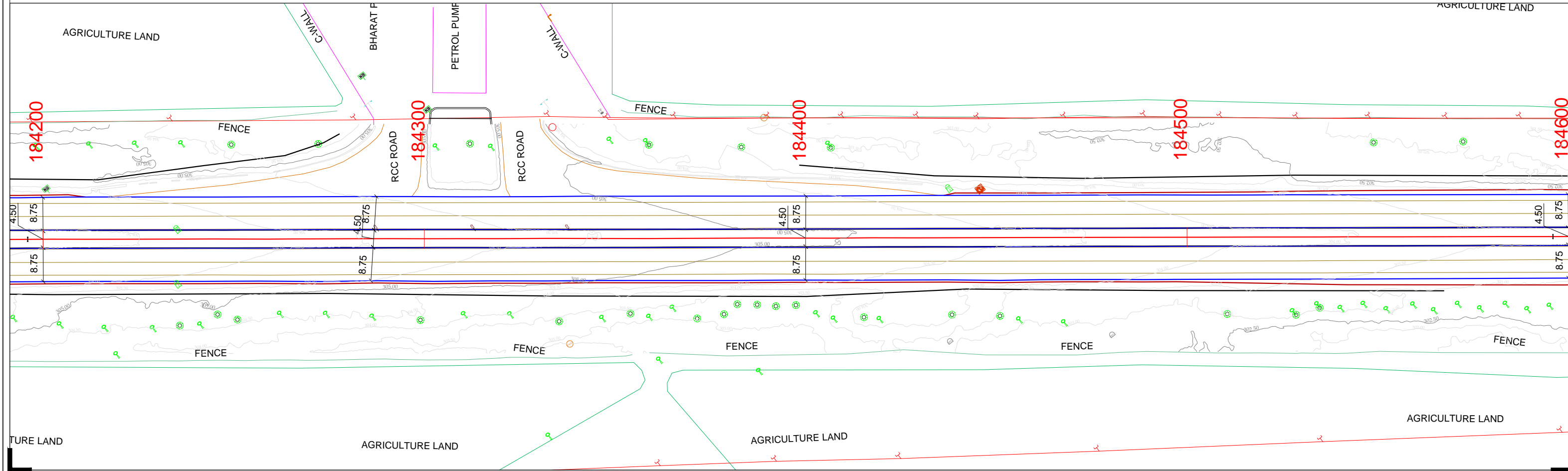
			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 182/600 TO 183/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS							SIZE		
						REV					
						A3					
						0					




6398

<<< TO KOTHAKOTA

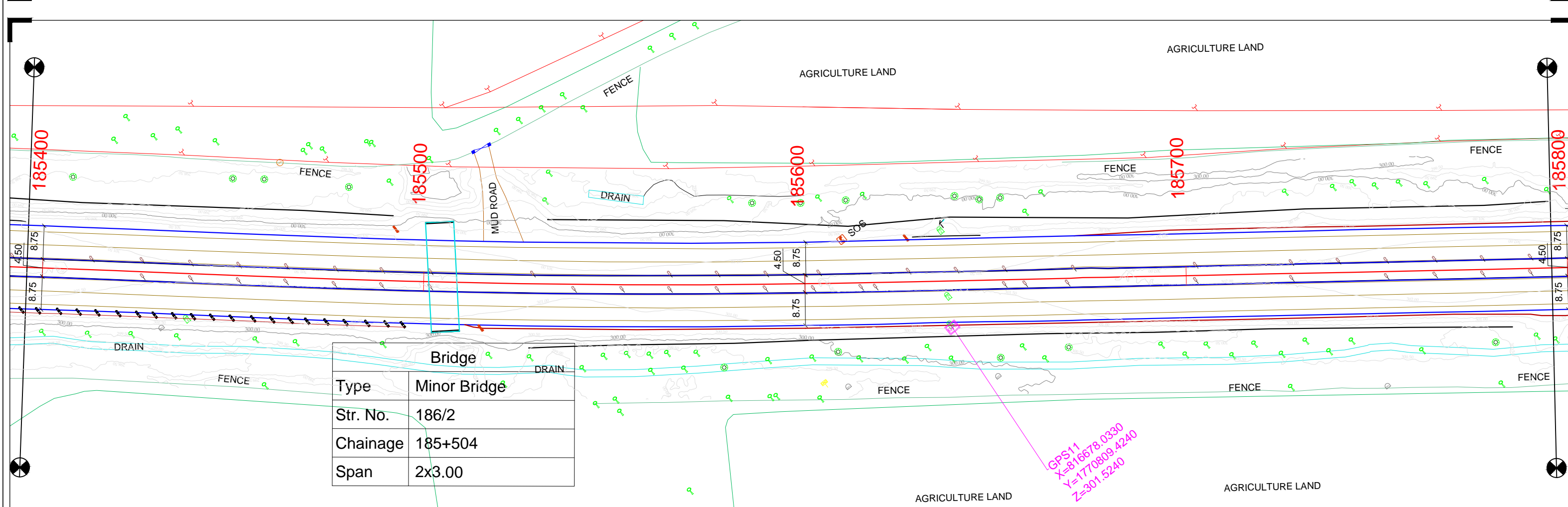
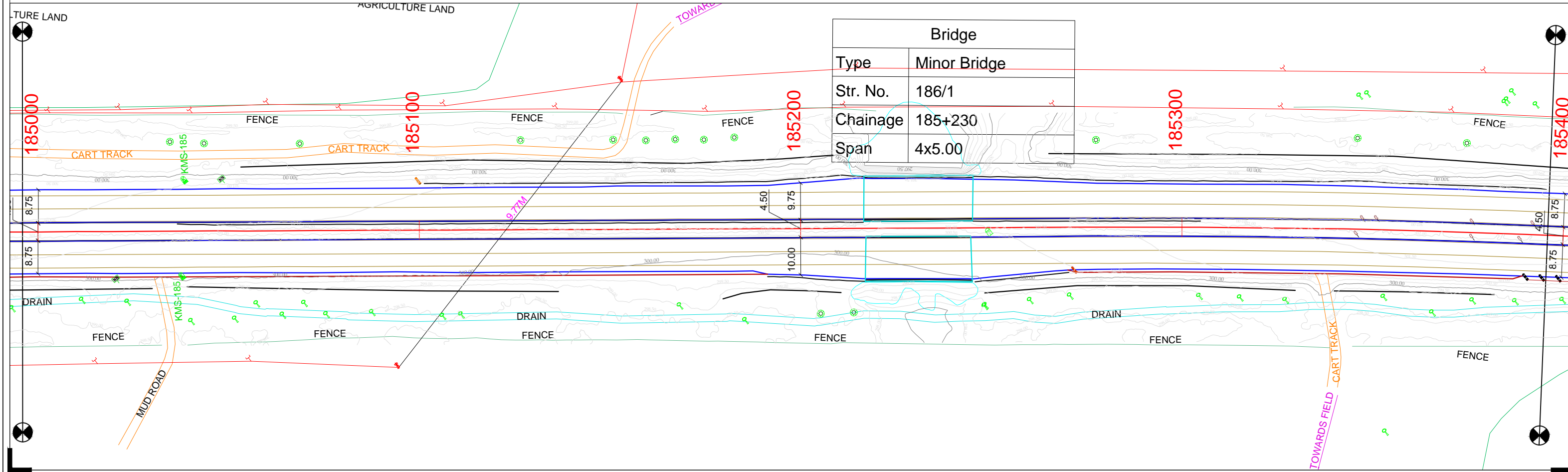
(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP




TO KURNOOL >>>

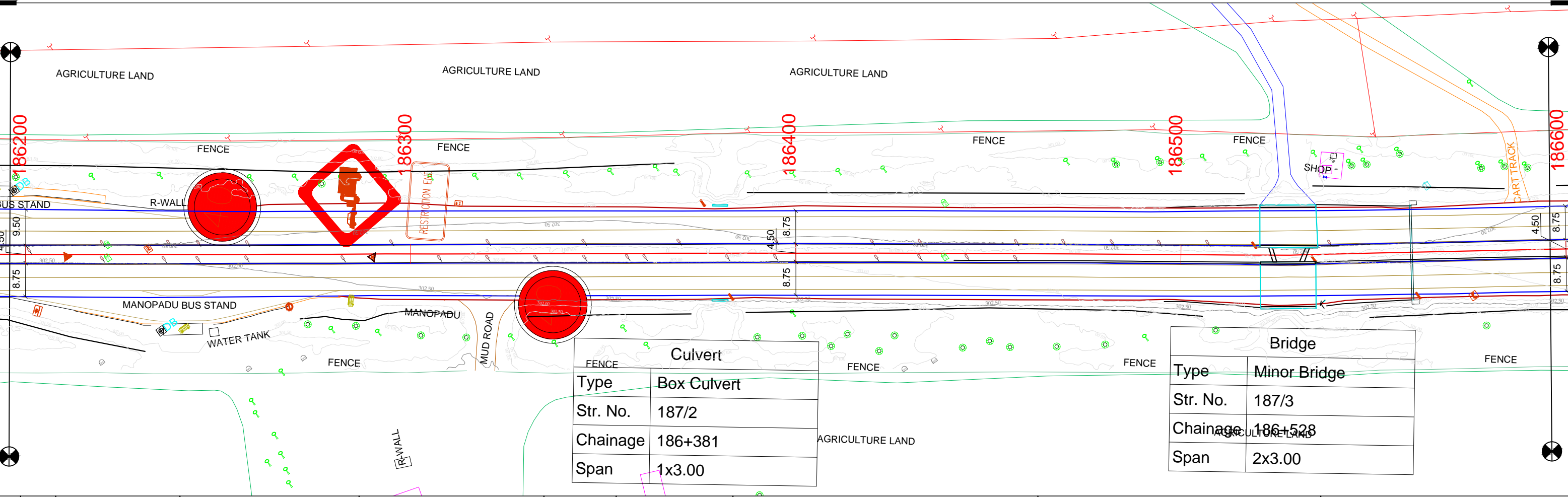
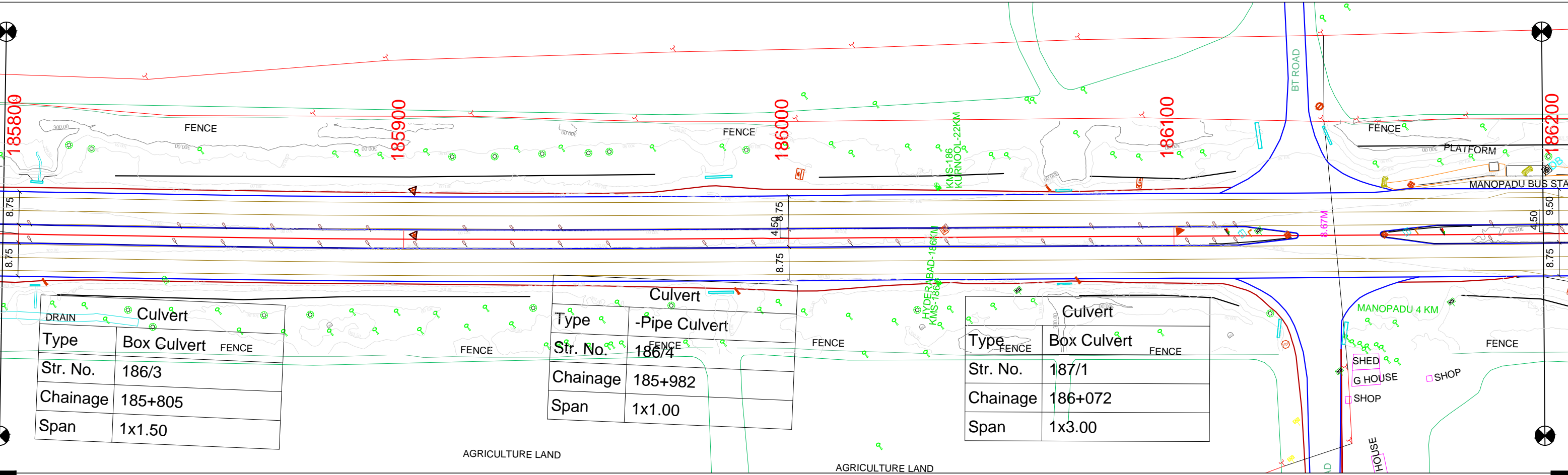





			<div>CLIENT :-  <b>NATIONAL HIGHWAY AUTHORITY OF INDIA</b></div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 184/200 TO 185/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY							
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY							



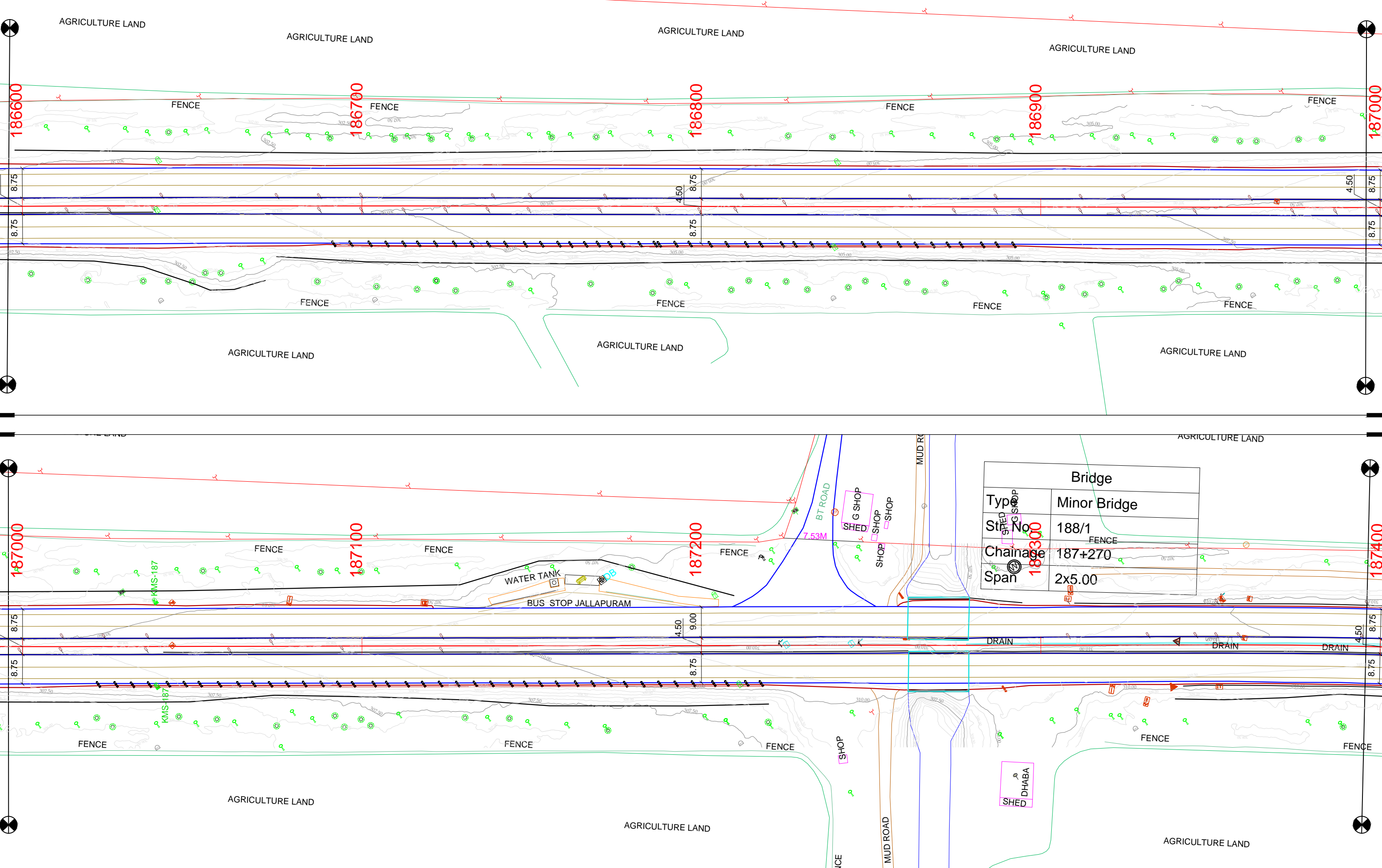




			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 185/000 TO 185/800			
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS			APPROVED BY						
										6400	

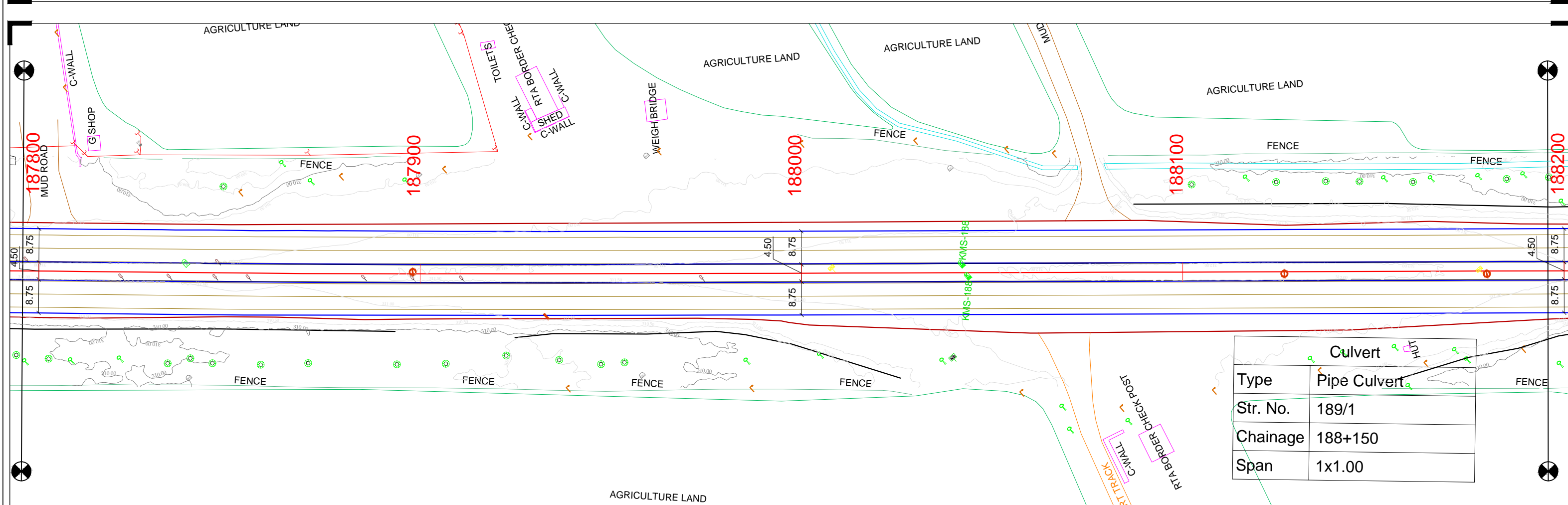
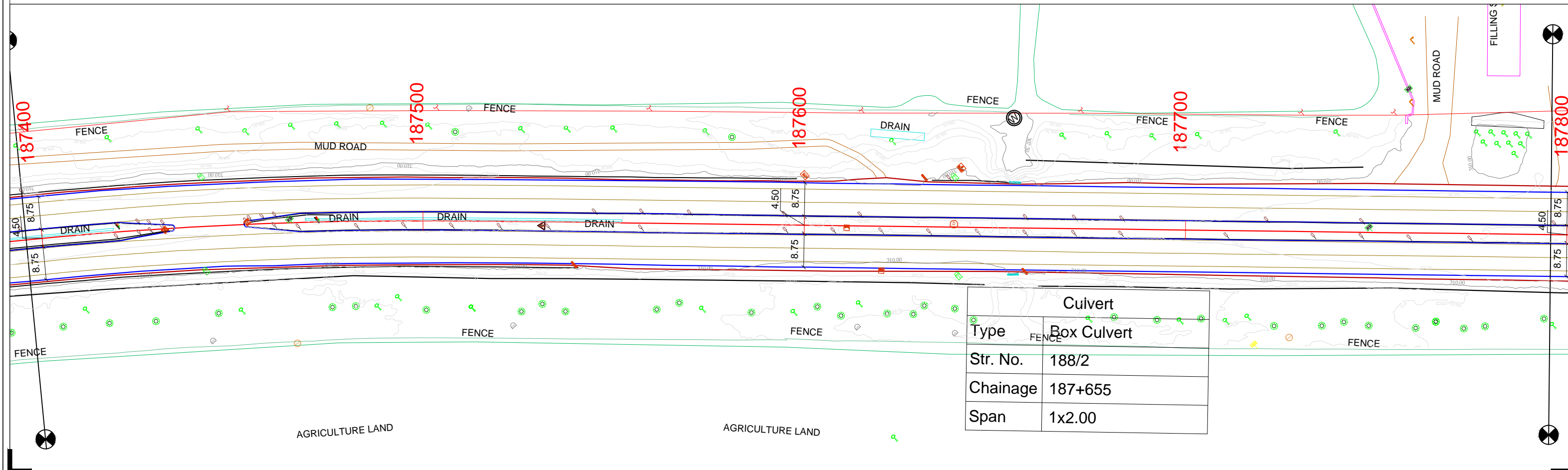




			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		CONSULTANT:-  TYPESA in JV with AVANZA Engineering Pvt. Ltd.  	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 185/800 TO 186/600				
				DESIGN BY					DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY					SHEET NO.	SCALE	SIZE	REV
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				6401	64	1 : 1000	A3	0

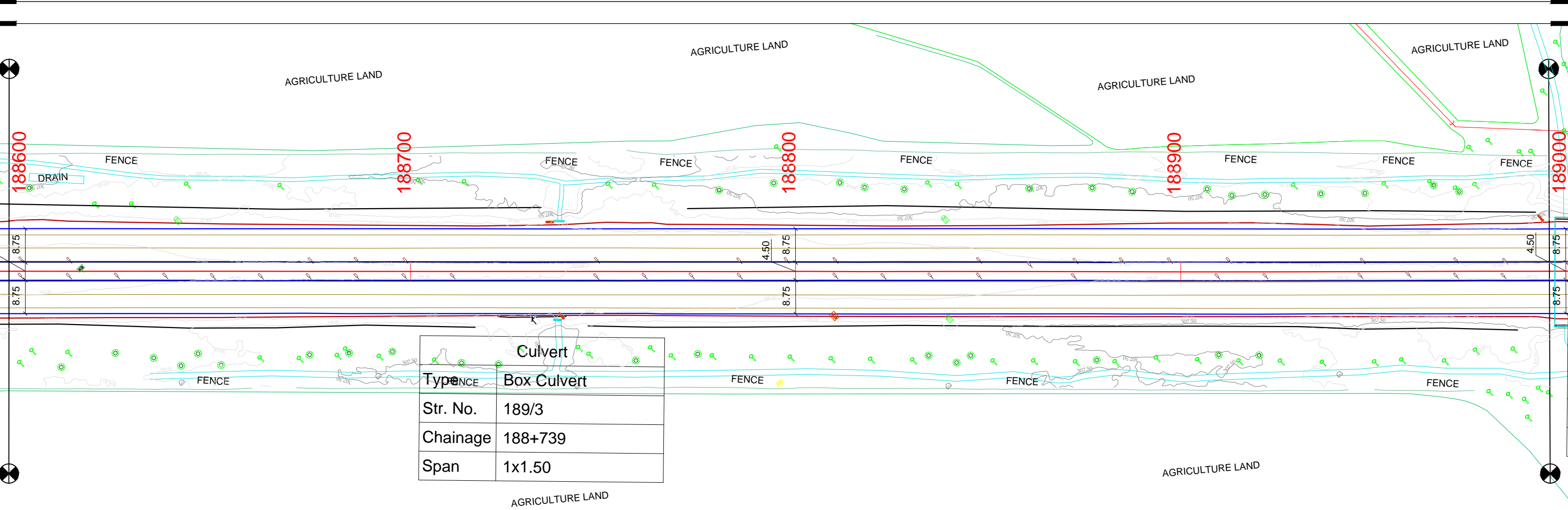
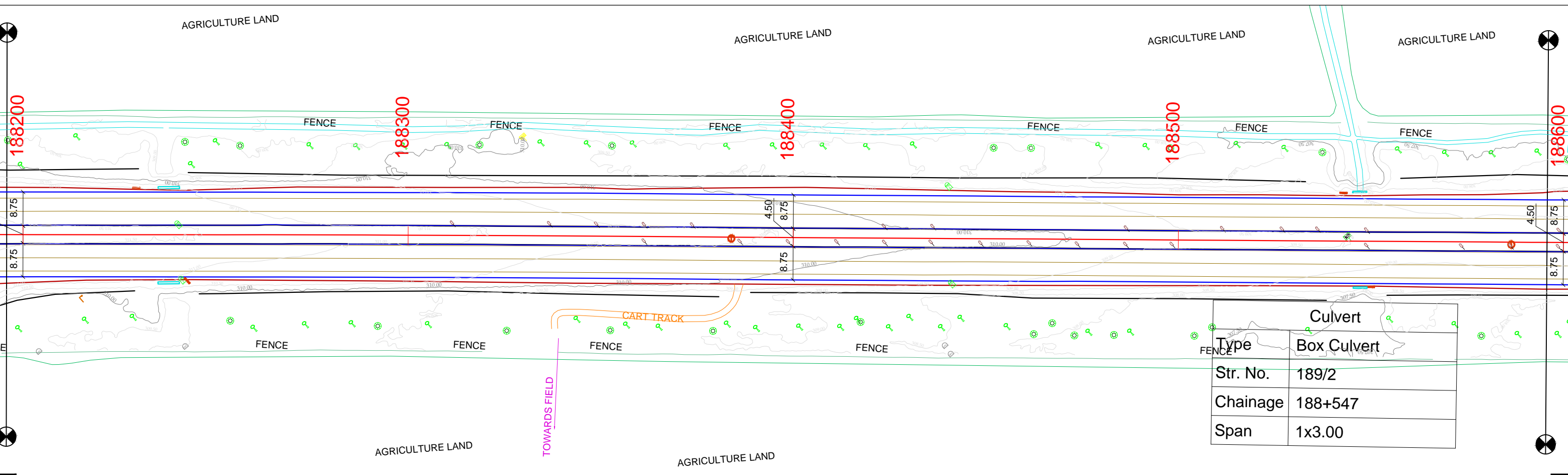




			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 186/600 TO 187/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				6402	65 1 : 1000 A3 0		



			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPISA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 187/400 TO 188/200			
				DESIGN BY				DRAWING NO.	AV_TYPISA/NHAI/InvIT/TOPO_S		
				CHECKED BY				SHEET NO.	SCALE	SIZE	REV
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				66	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

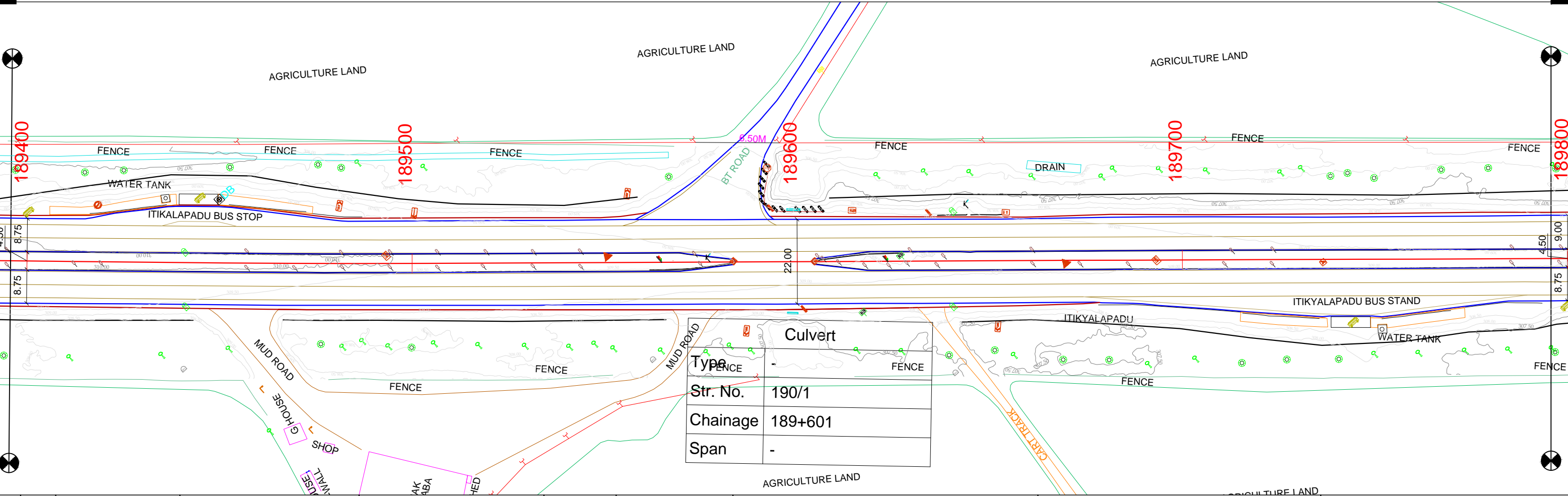
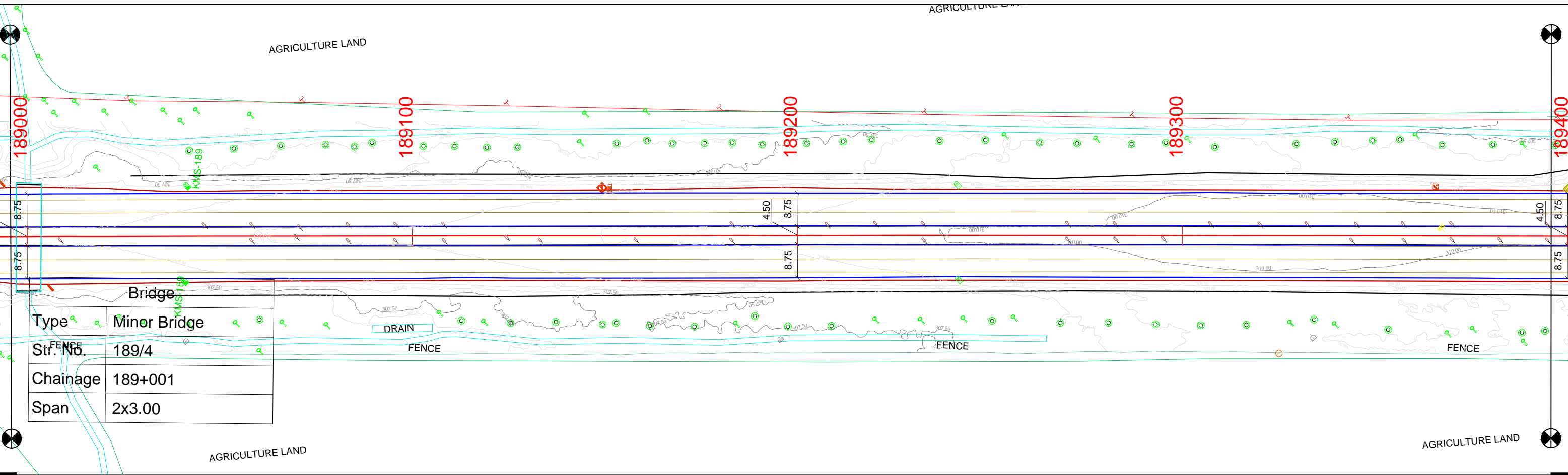
  


PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

TITLE:-		KMS 188/200 TO 189/000	
DRAWING NO.		AV_TYPSA/NHAI/InvIT/TOPO_S	
SHEET NO.	SCALE	SIZE	REV
67	1 : 1000	A3	0





REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-  
  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY  
DESIGN BY  
CHECKED BY  
APPROVED BY

CONSULTANT:-  
TYPISA in JV with  
AVANZA Engineering Pvt. Ltd.

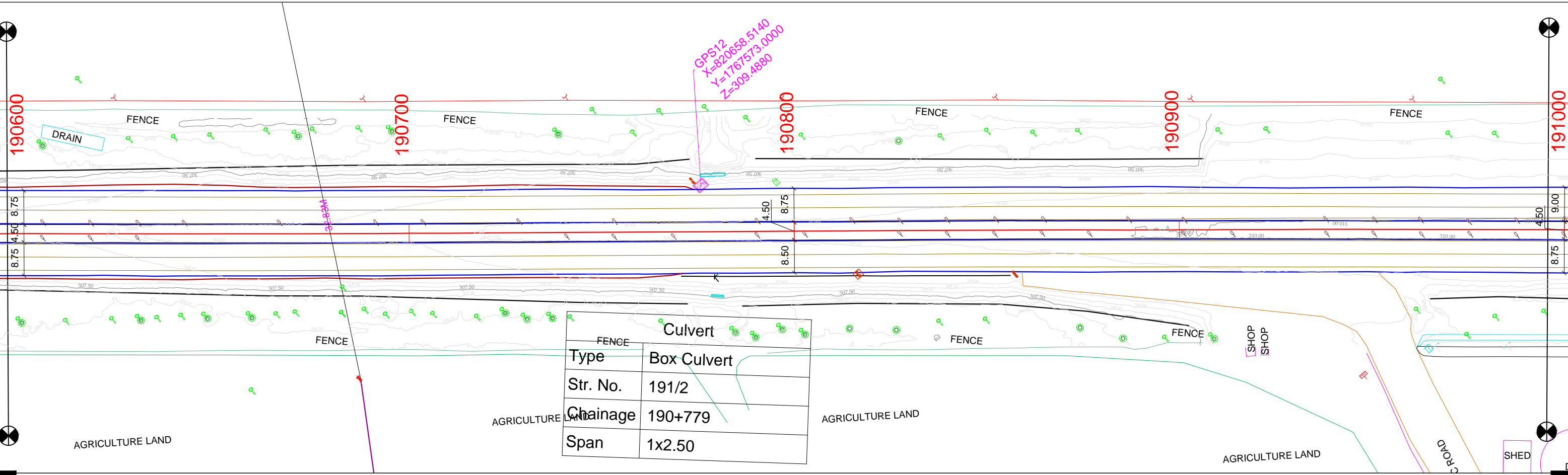


PROJECT :-  
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

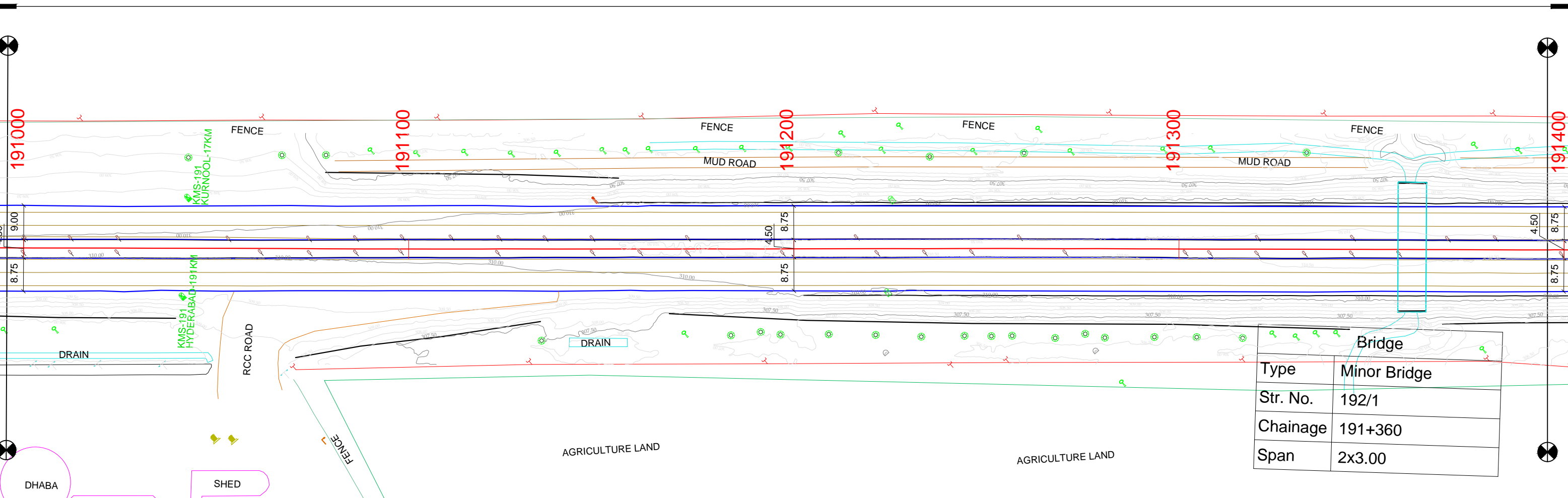
TITLE:- KMS 189/000 TO 189/800			
DRAWING NO. AV_TYPISA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
68	1 : 1000	A3	0







Culvert	
Type	Box Culvert
Str. No.	191/2
Chainage	190+779
Span	1x2.50



Bridge	
Type	Minor Bridge
Str. No.	192/1
Chainage	191+360
Span	2x3.00

REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

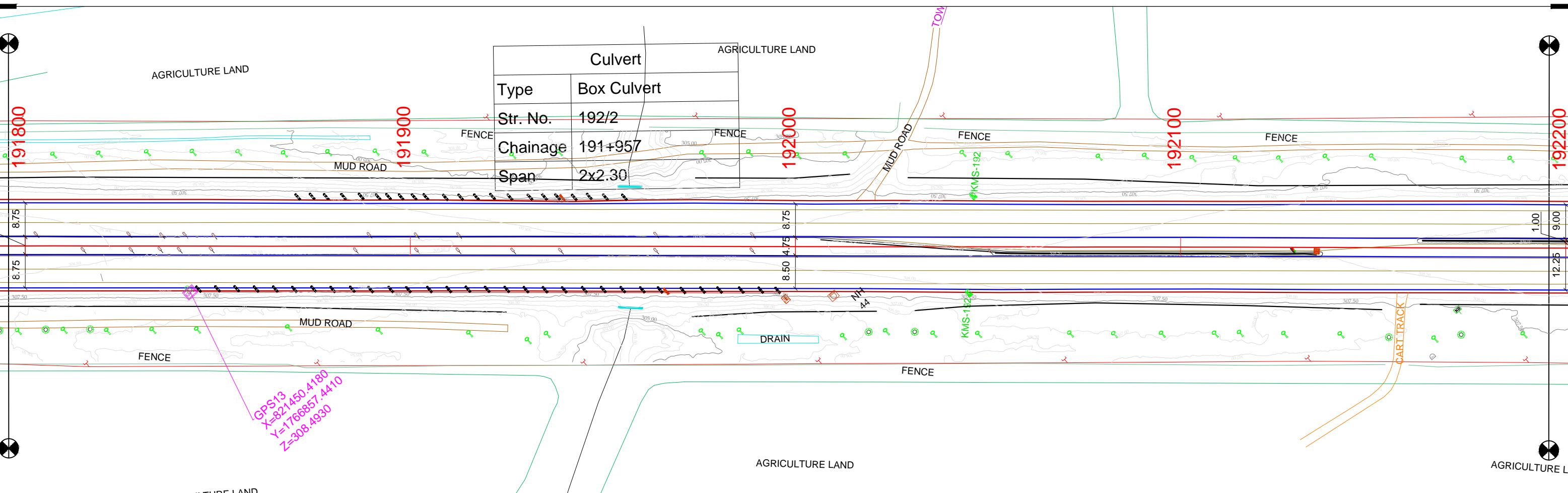
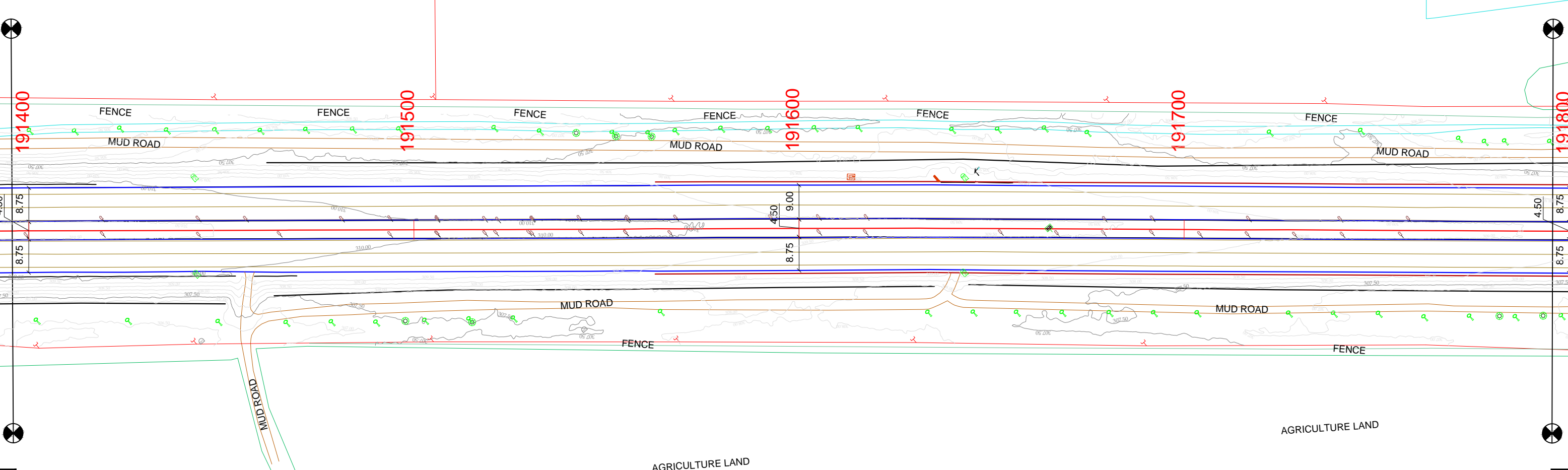
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model



TITLE:- KMS 190/600 TO 191/400			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
70	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS

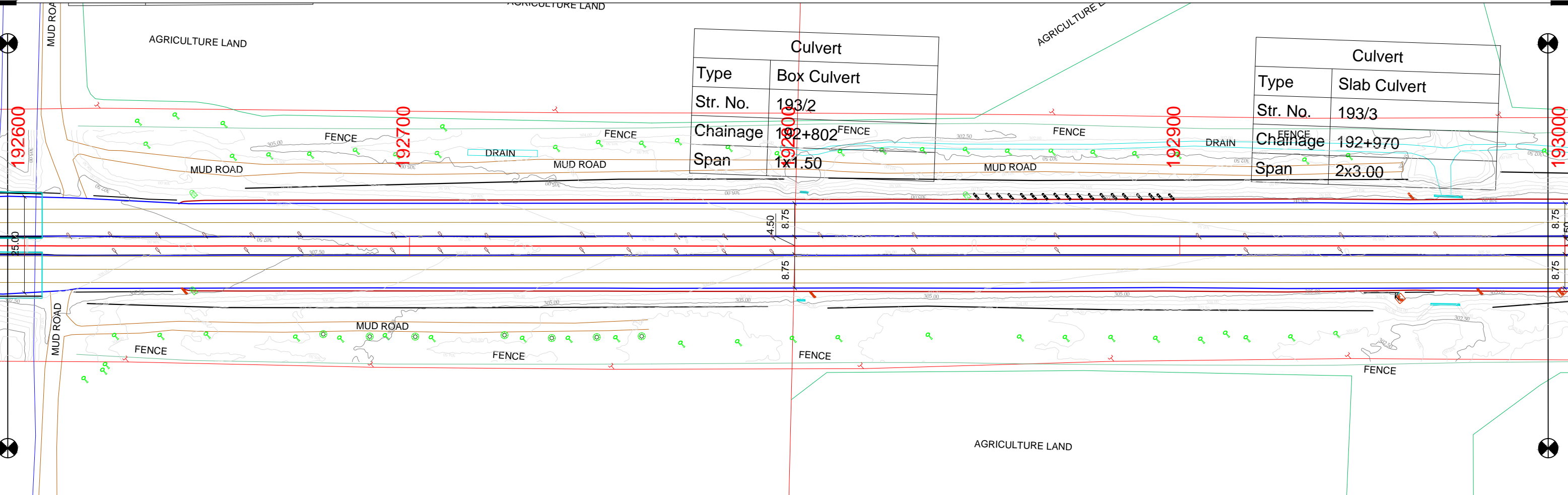
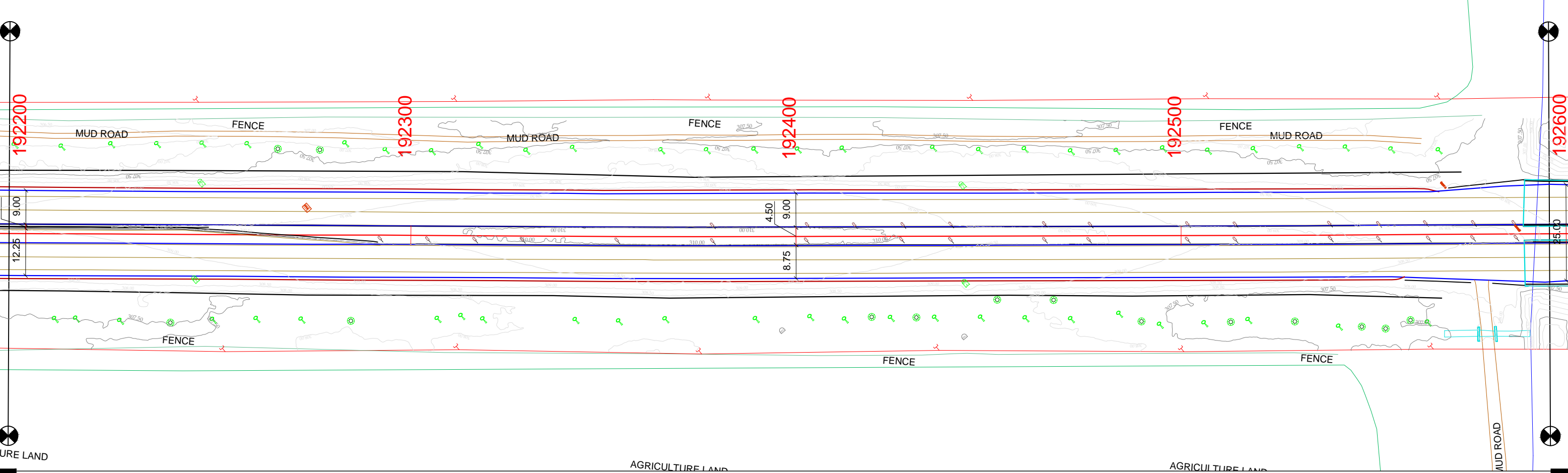
CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**



DRAWN BY  
DESIGN BY  
CHECKED BY  
APPROVED BY

CONSULTANT:-  
**TYPESA in JV with  
AVANZA Engineering Pvt. Ltd.**  
  


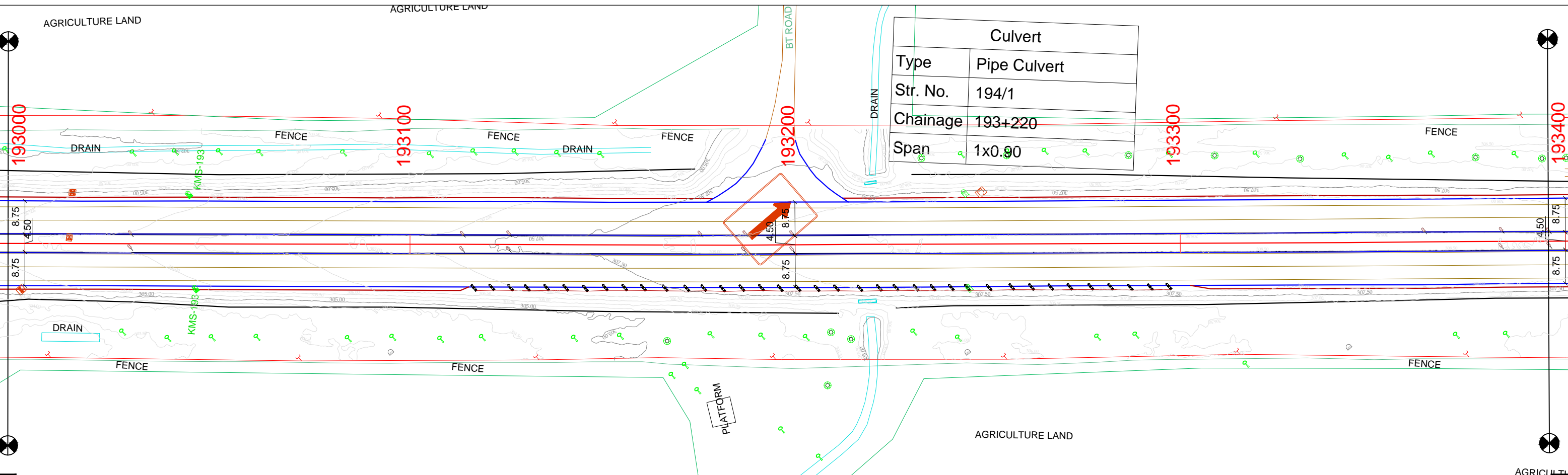
PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 191/400 TO 192/200			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
71	1 : 1000	A3	0

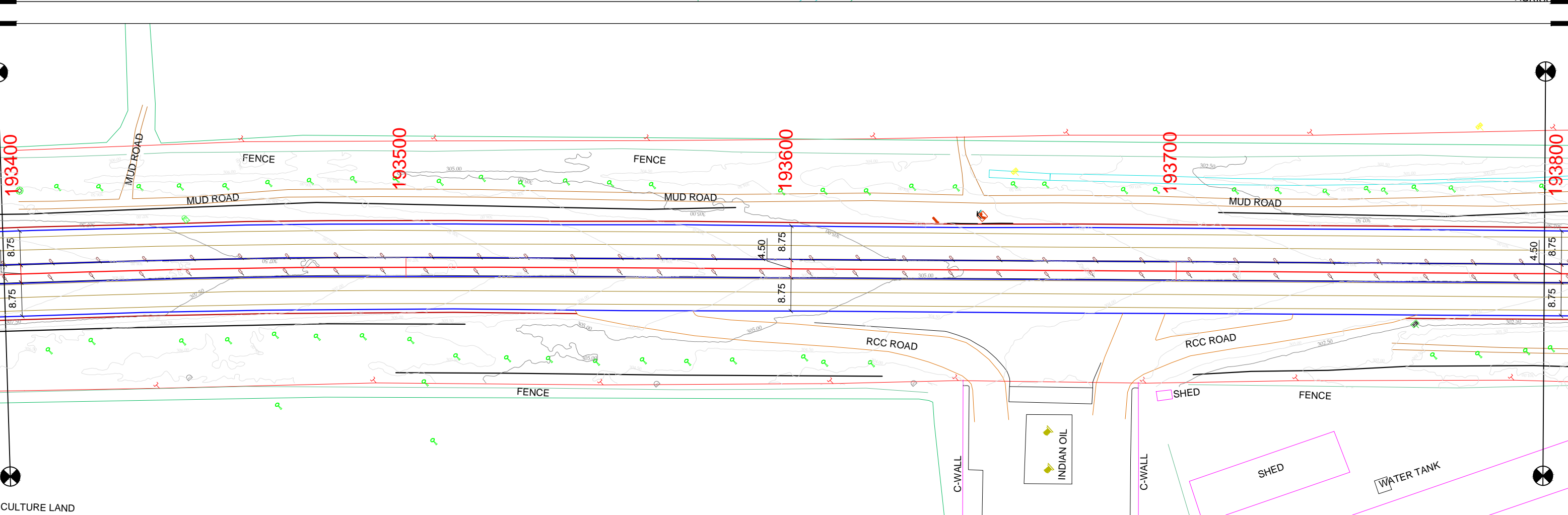


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 192/200 TO 193/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				72 1 : 1000 A3 0			





Culvert	
Type	Pipe Culvert
Str. No.	194/1
Chainage	193+220
Span	1x0.90



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

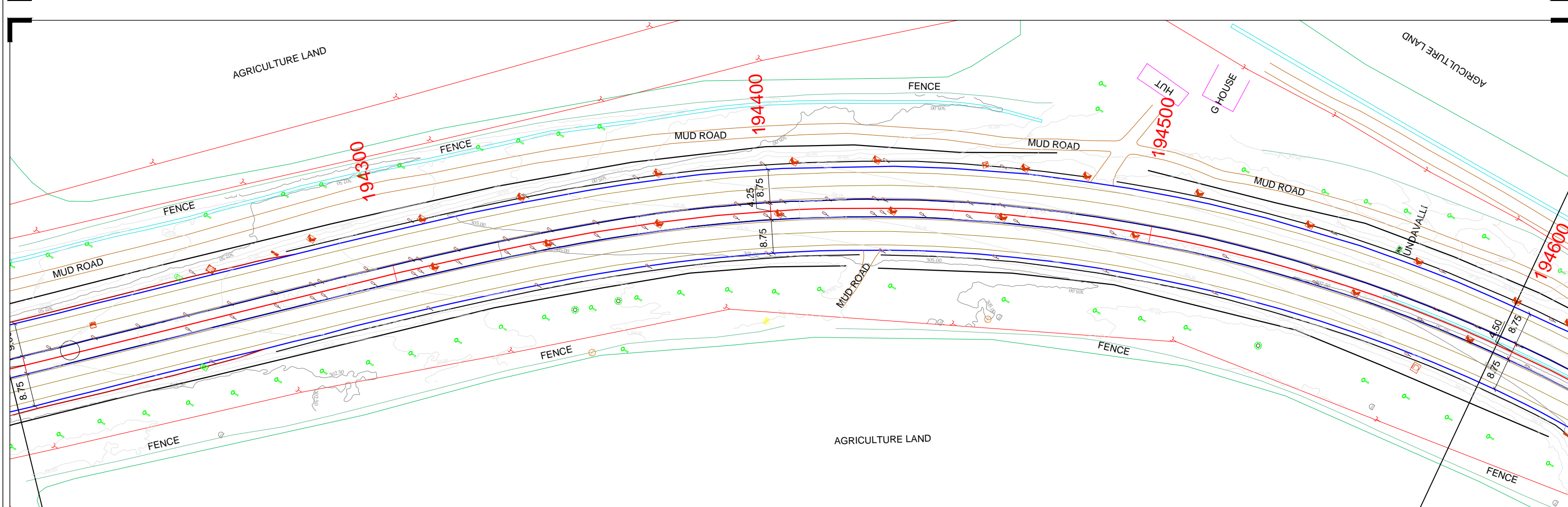
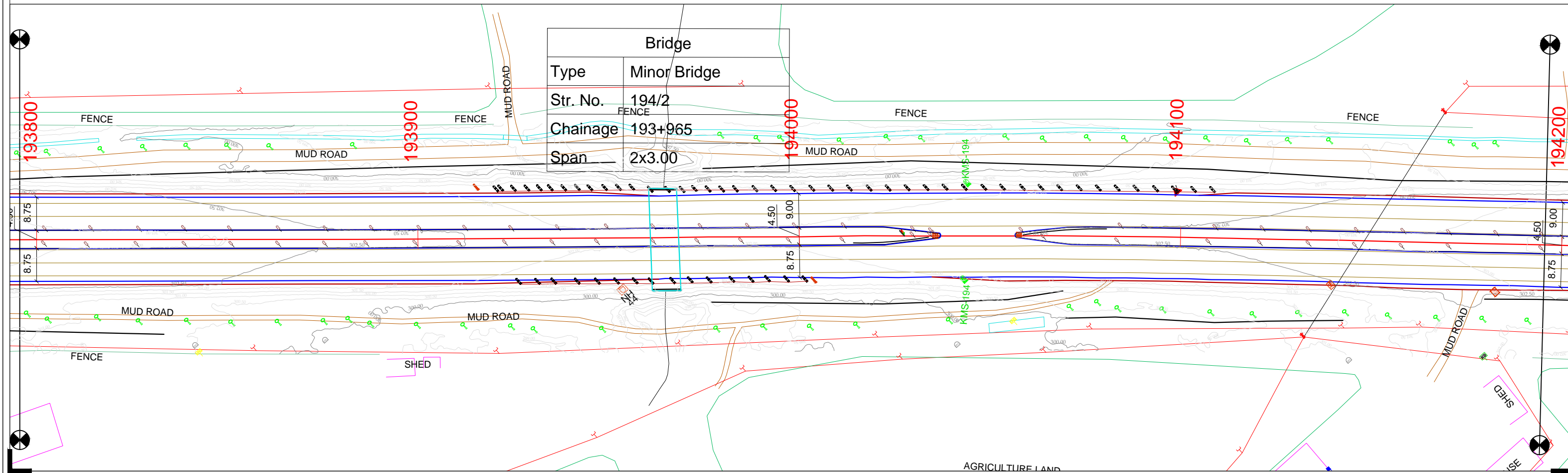
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.




  


PROJECT :-

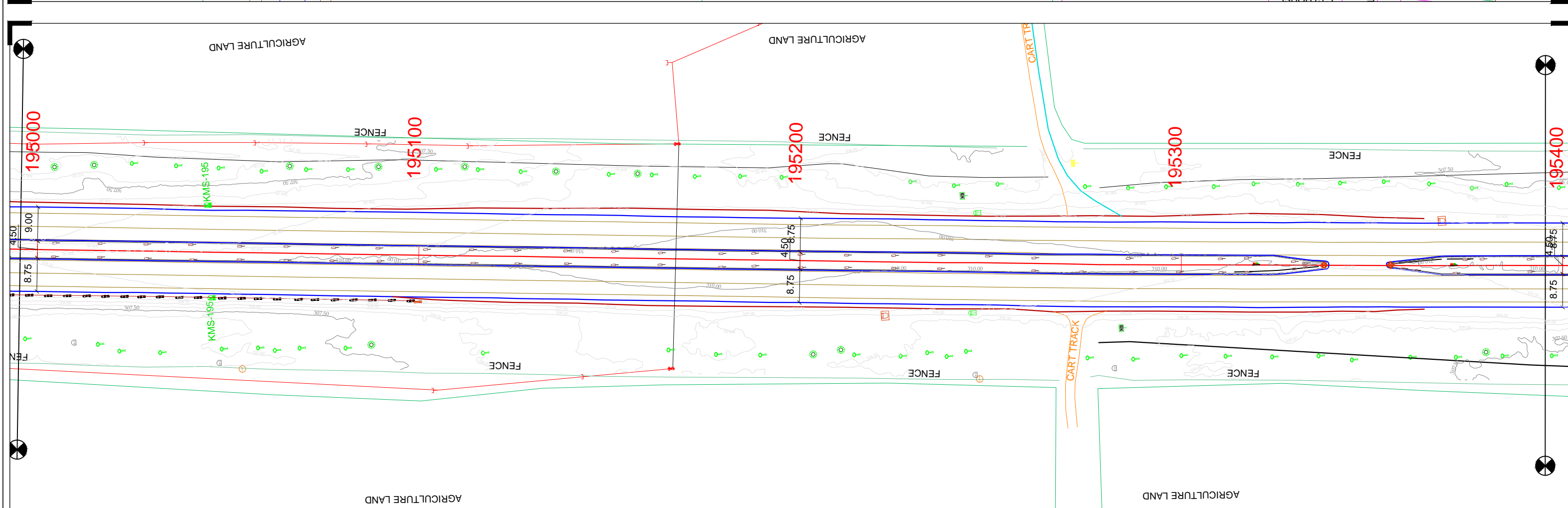
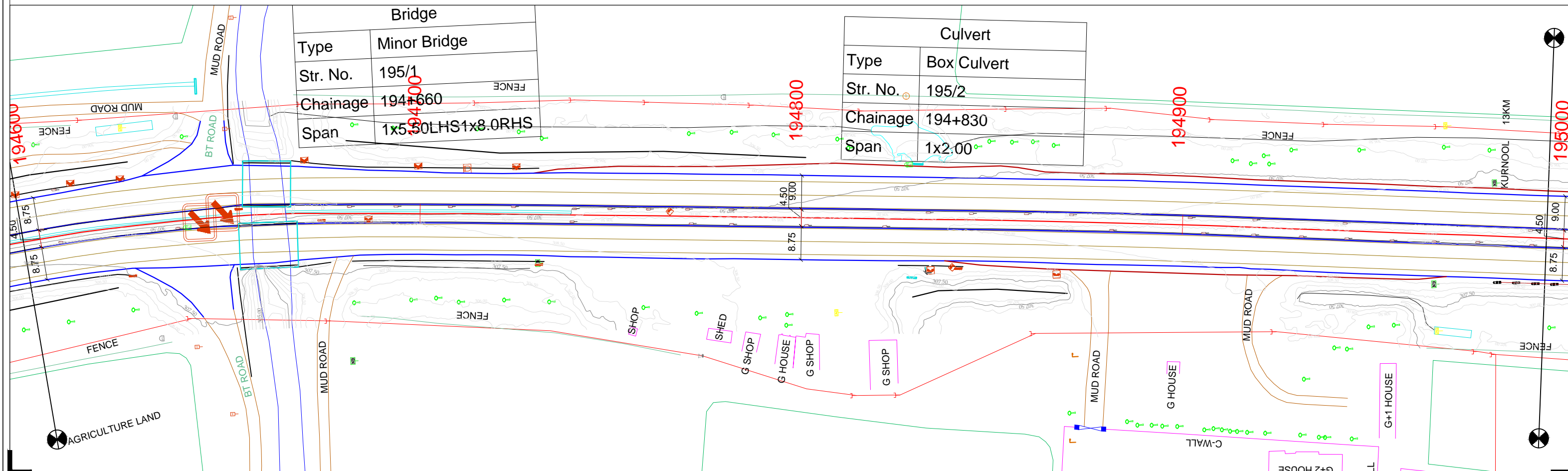
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model




TITLE:- KMS 193/000 TO 193/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
73	1 : 1000	A3	0

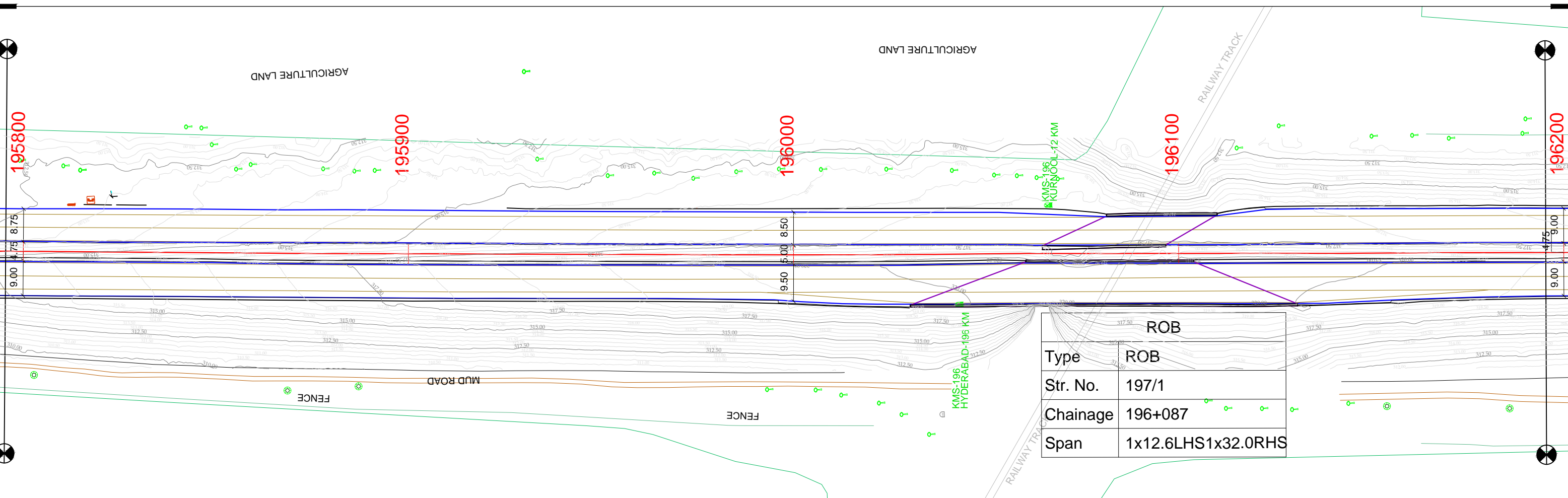
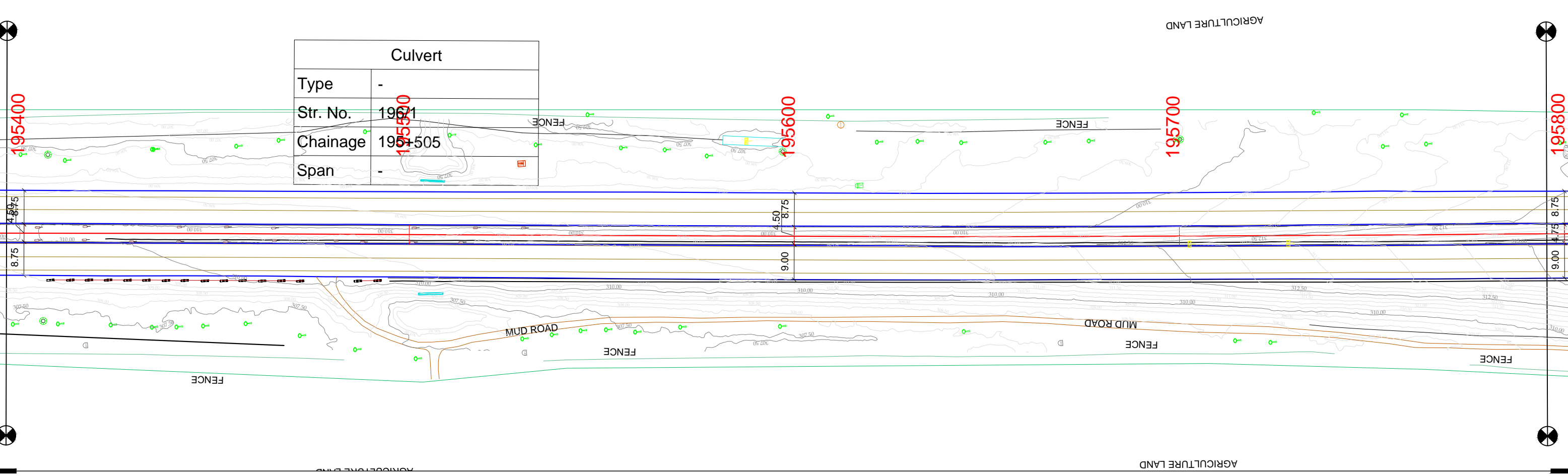


			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 193/800 TO 194/600						
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S						
REV	DATE	DESCRIPTION OF REVISIONS			CHECKED BY						SHEET NO.	SCALE	SIZE	REV
					APPROVED BY						74	1 : 1000	A3	0





			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 194/600 TO 195/400			
				DESIGN BY				DRAWING NO. AV_TYPSPA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS						SIZE			
					REV						
					75						
					1 : 1000						
					A3						
					0						



REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-





NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

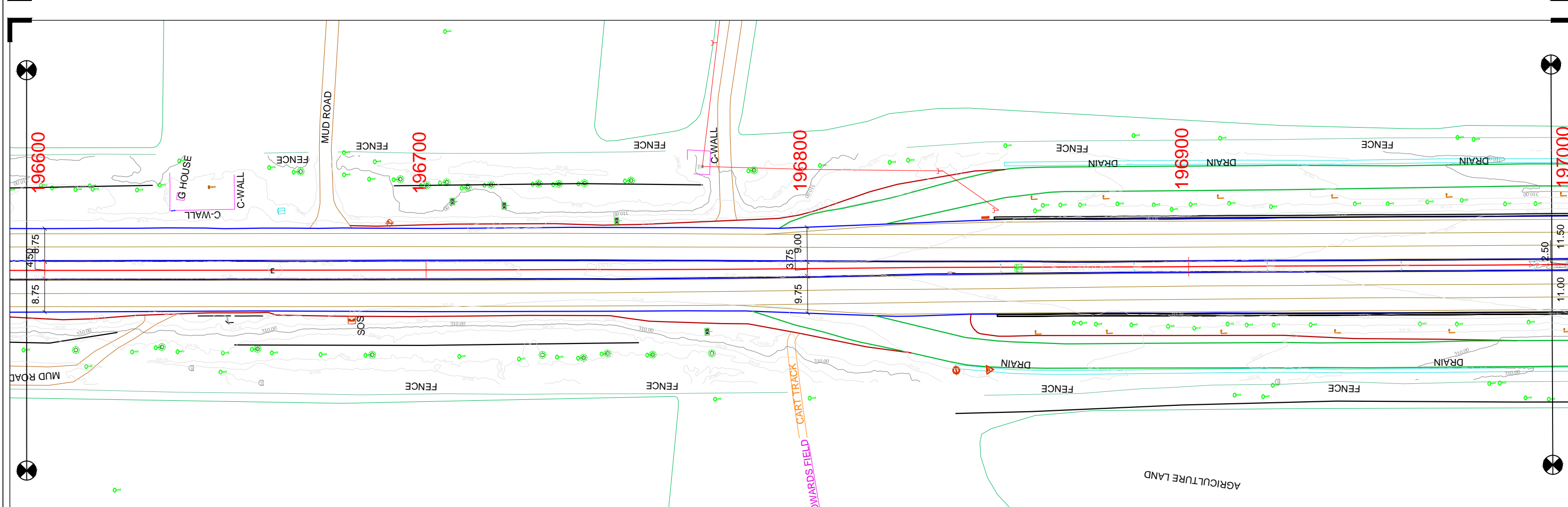
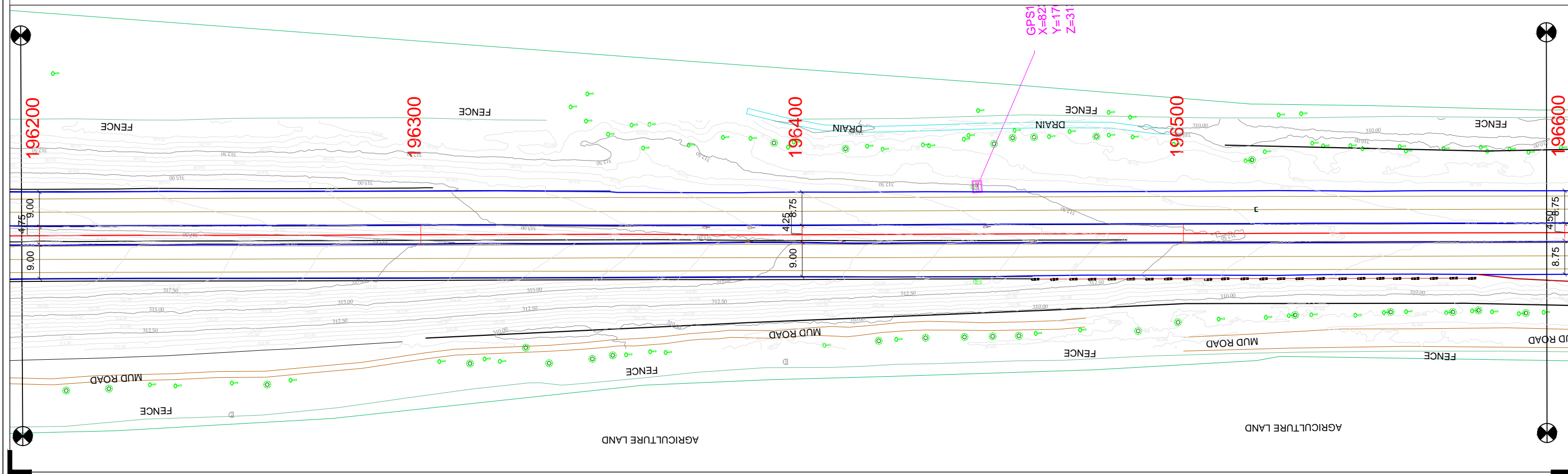
TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.






PROJECT :-

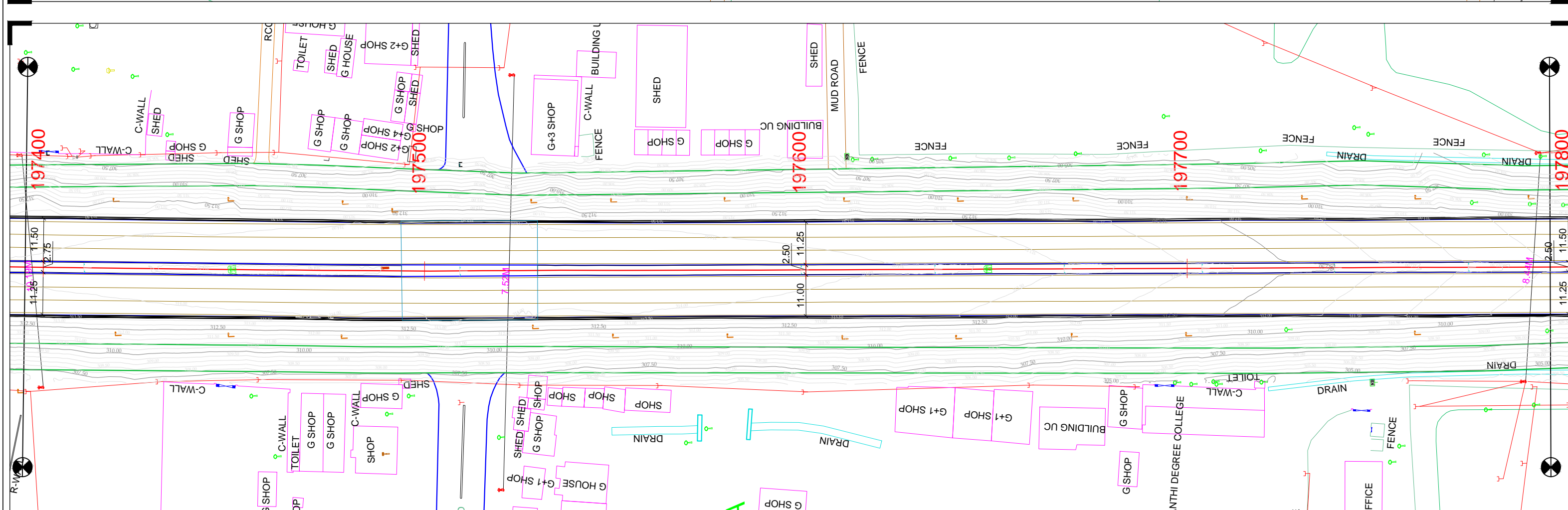
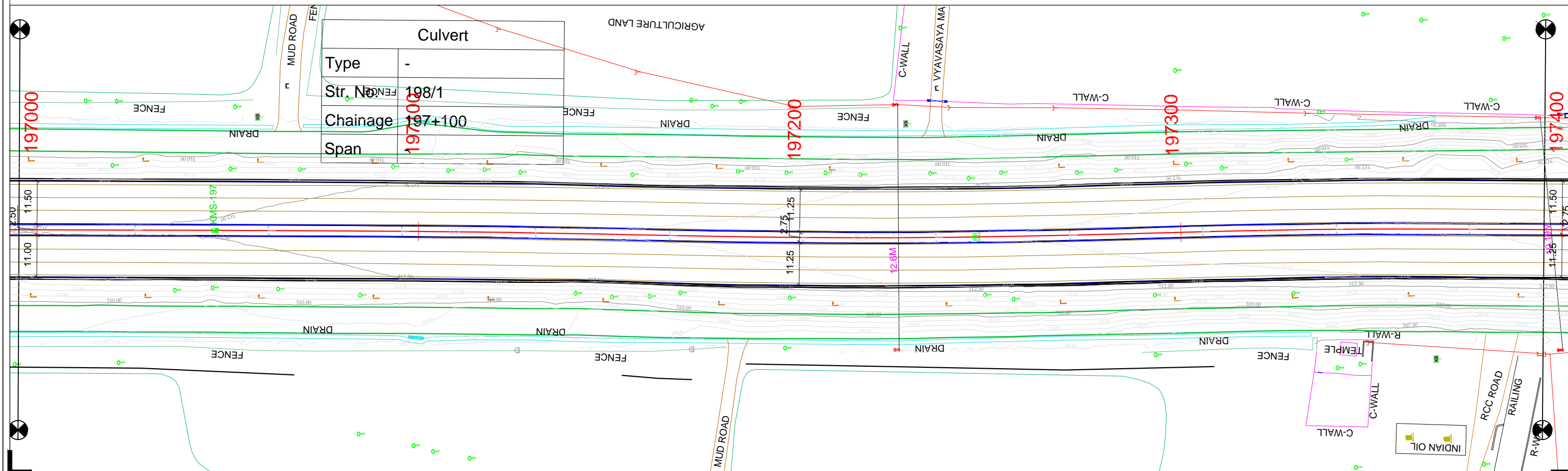
Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model




TITLE:-		KMS 195/400 TO 196/200	
DRAWING NO.		AV_TYPSA/NHAI/InvIT/TOPO_S	
SHEET NO.	SCALE	SIZE	REV
76	1 : 1000	A3	0

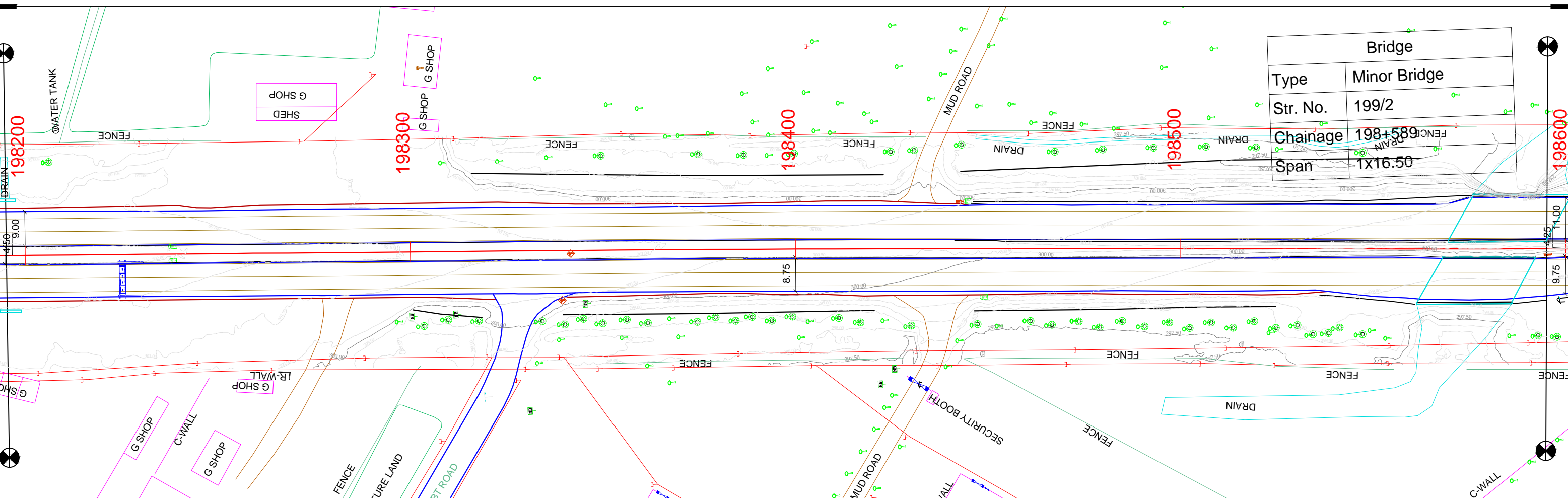
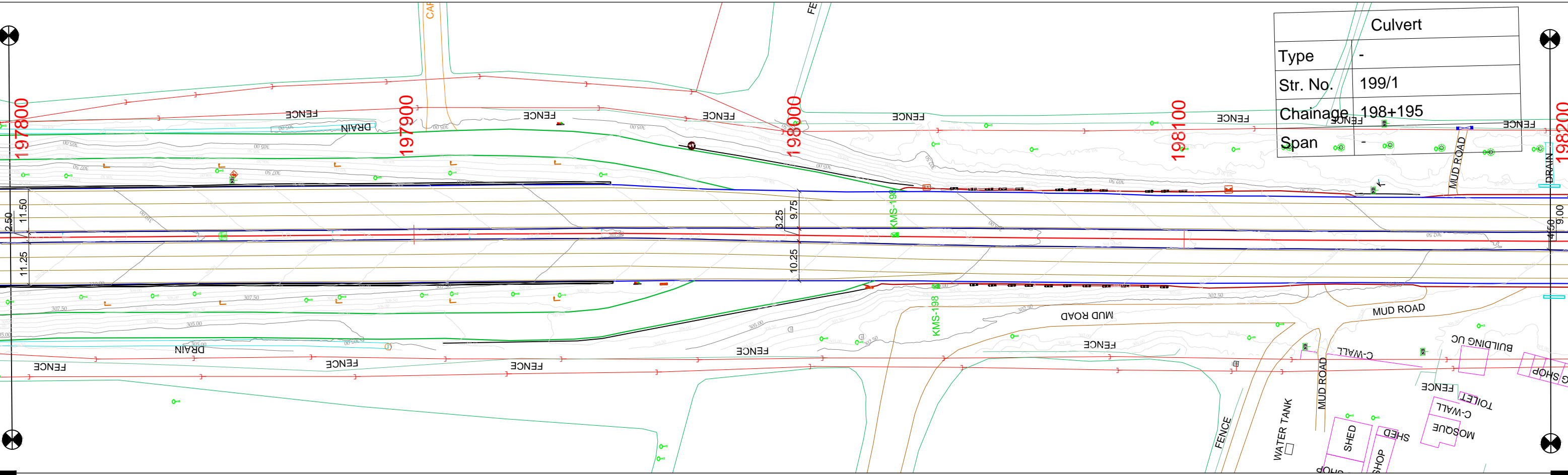


			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 196/200 TO 197/000			
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS									





			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 197/000 TO 197/800			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				78 1 : 1000 A3 0			
								6415			



REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

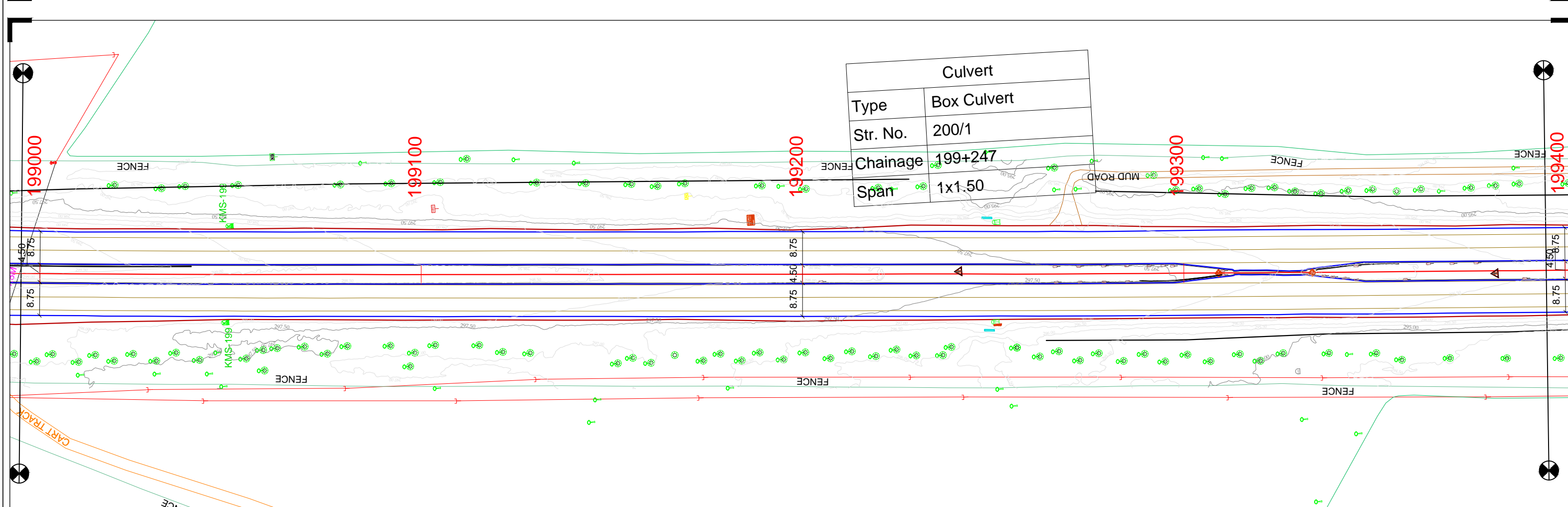
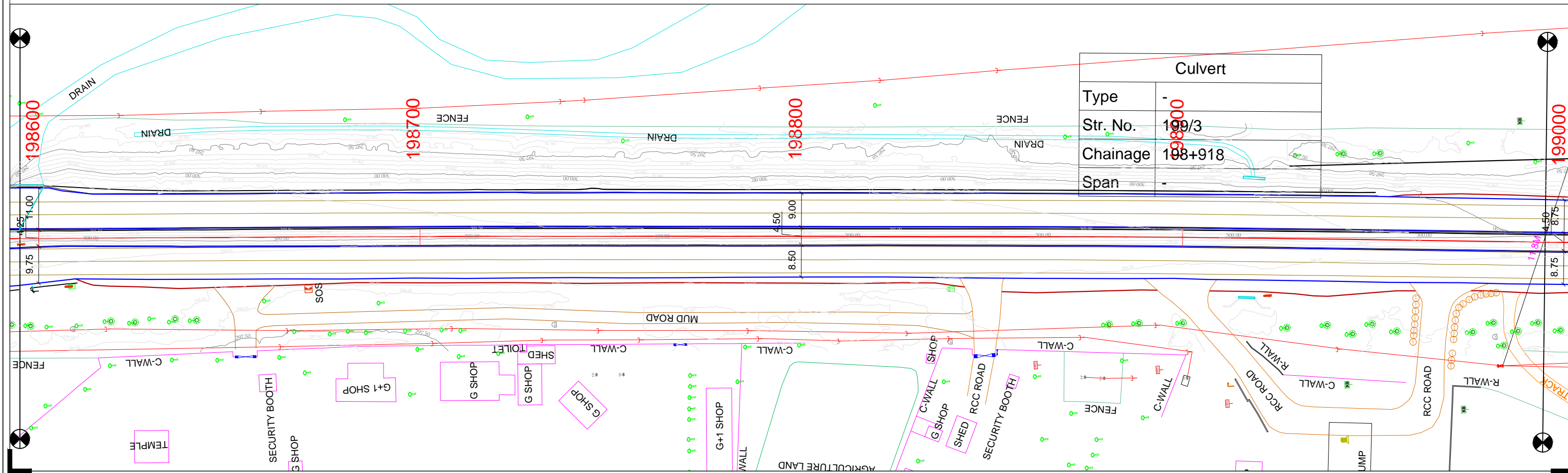
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	




CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**  

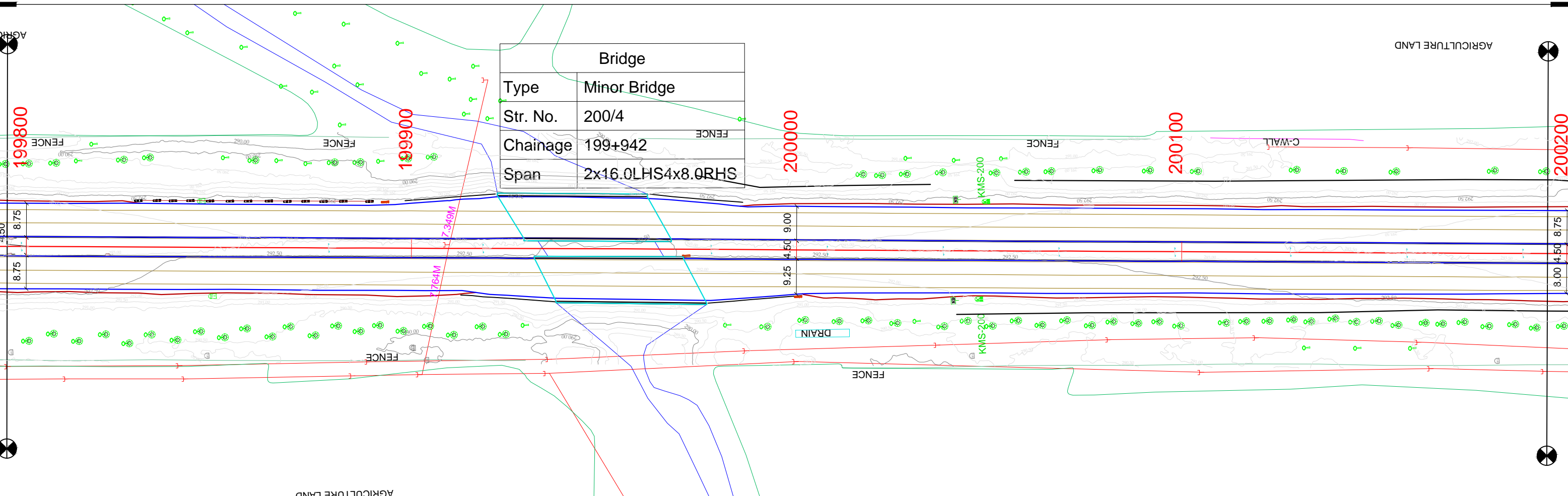
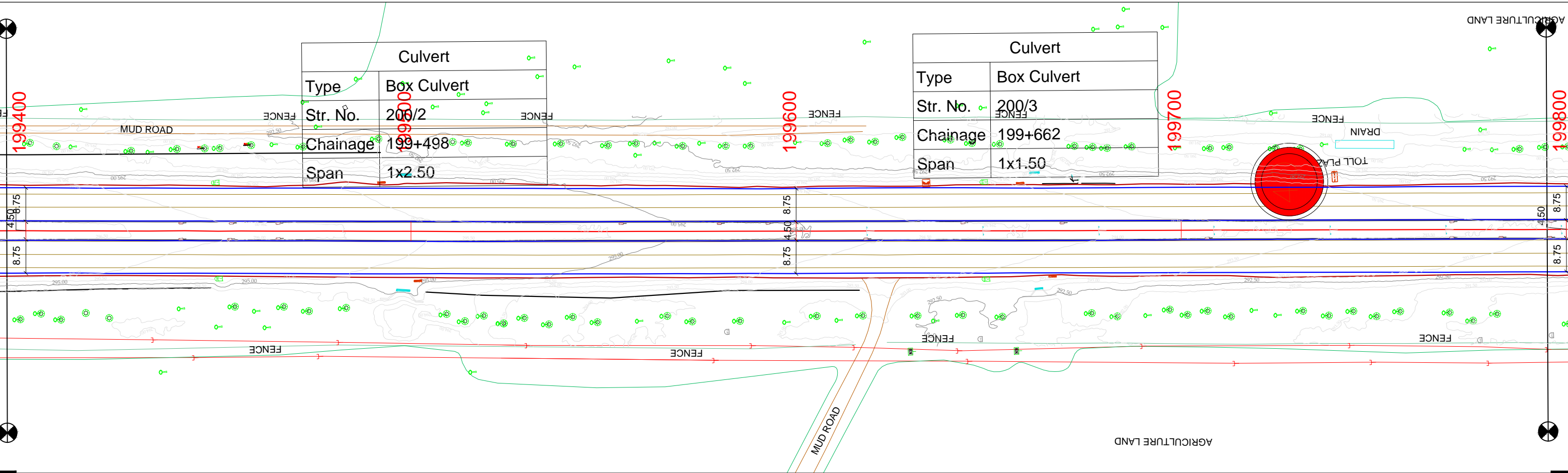

PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:- KMS 197/800 TO 198/600			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
79	1 : 1000	A3	0






			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPESA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 198/600 TO 199/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				80	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS


CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

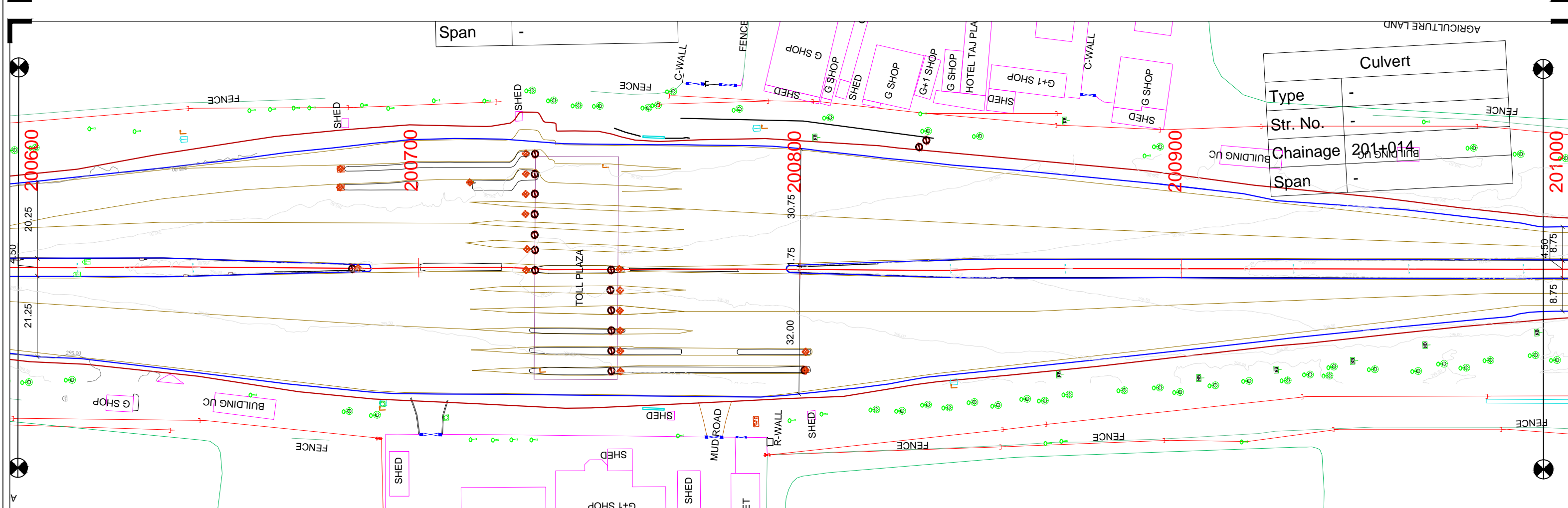
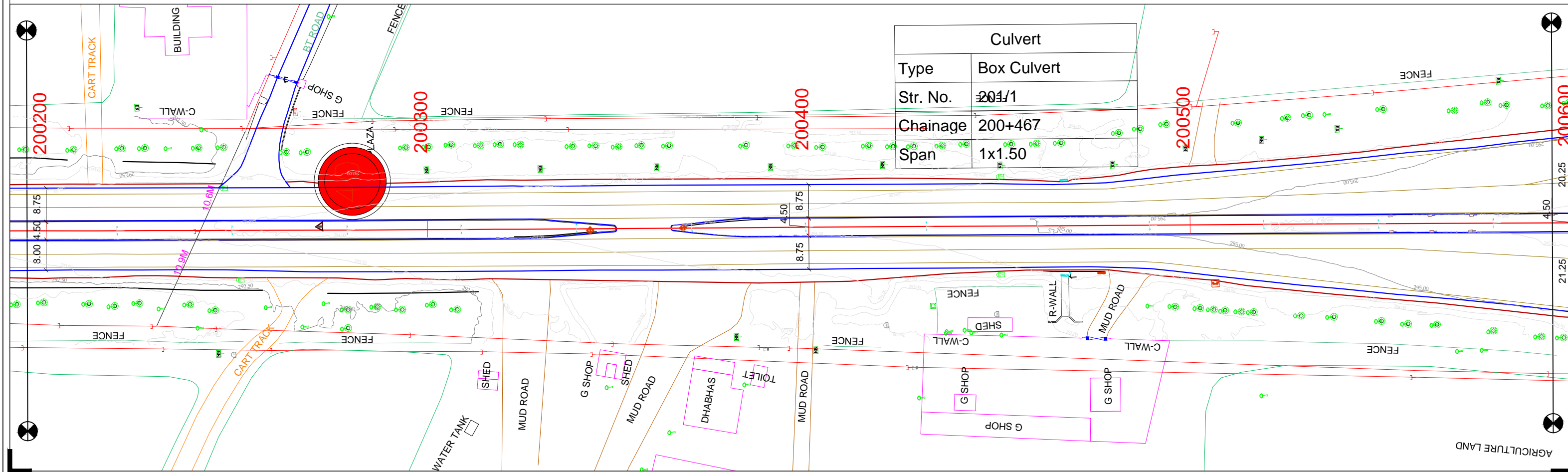
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	



CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**  


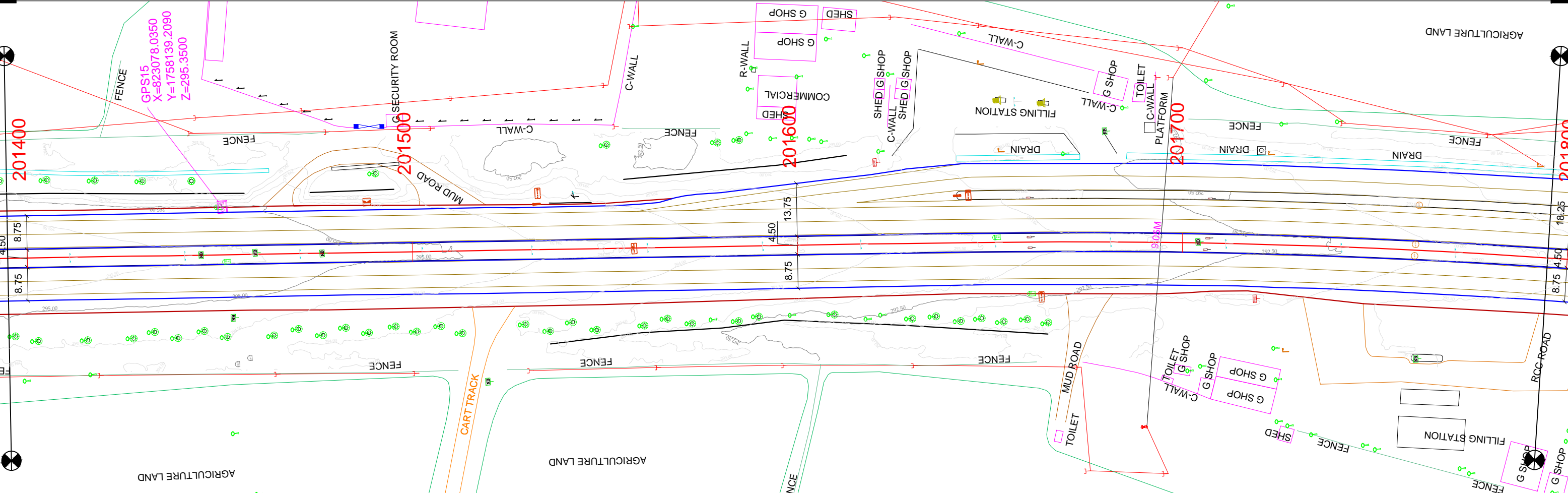
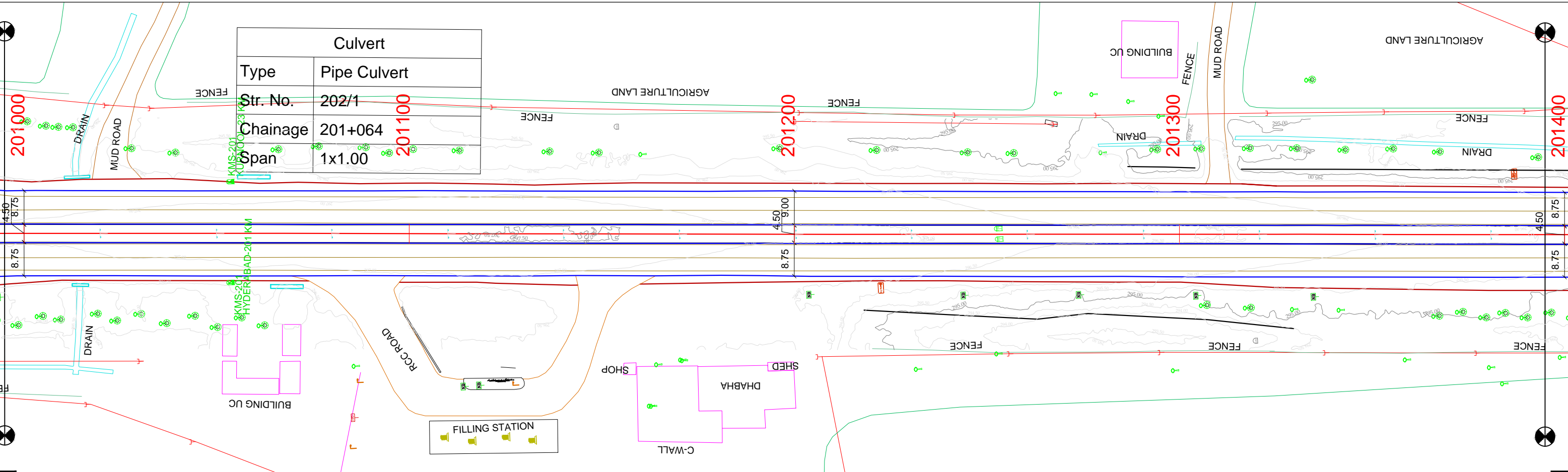
PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

TITLE:-	KMS 199/400 TO 200/200			
DRAWING NO.	AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV	
81	1 : 1000	A3	0	





REV			DATE	DESCRIPTION OF REVISIONS	CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA	DRAWN BY DESIGN BY CHECKED BY APPROVED BY	CONSULTANT:- TYPSPA in JV with AVANZA Engineering Pvt. Ltd. 	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 200/200 TO 201/000			
									DRAWING NO. AV_TYPSPA/NHAI/InvIT/TOPO_S			
									SHEET NO.	SCALE	SIZE	REV
									82	1 : 1000	A3	0



REV	DATE	DESCRIPTION OF REVISIONS



CLIENT :-

  
NATIONAL HIGHWAY  
AUTHORITY OF INDIA

DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	

CONSULTANT:-

TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.

PROJECT :-

Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model

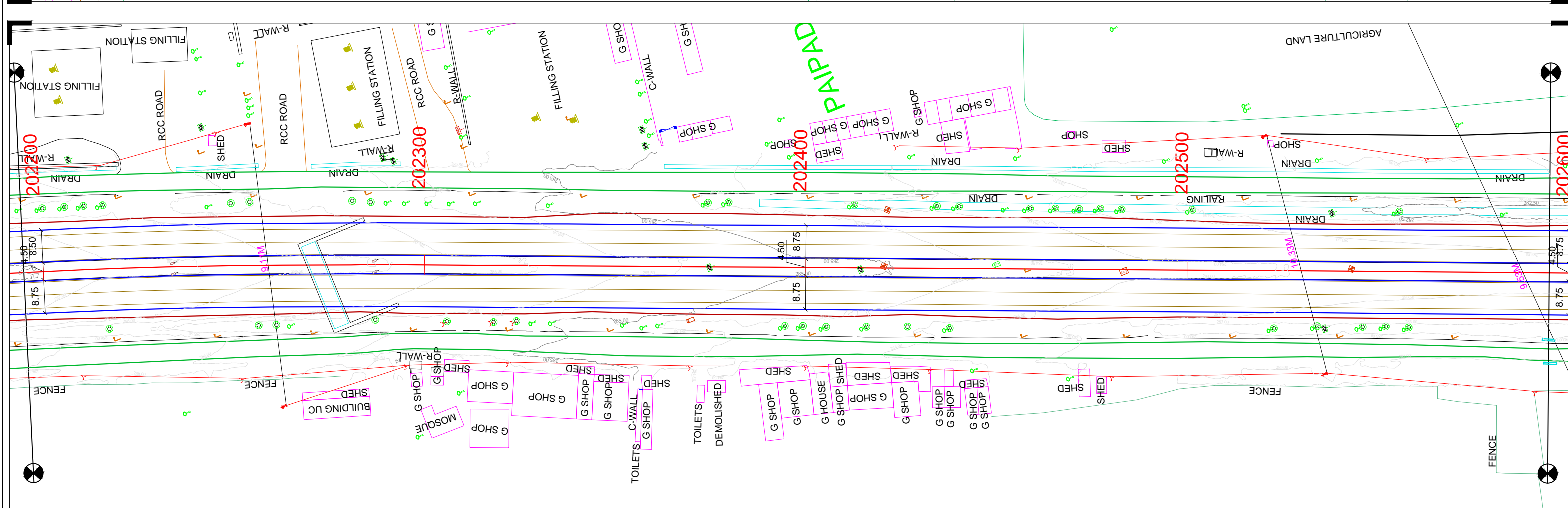
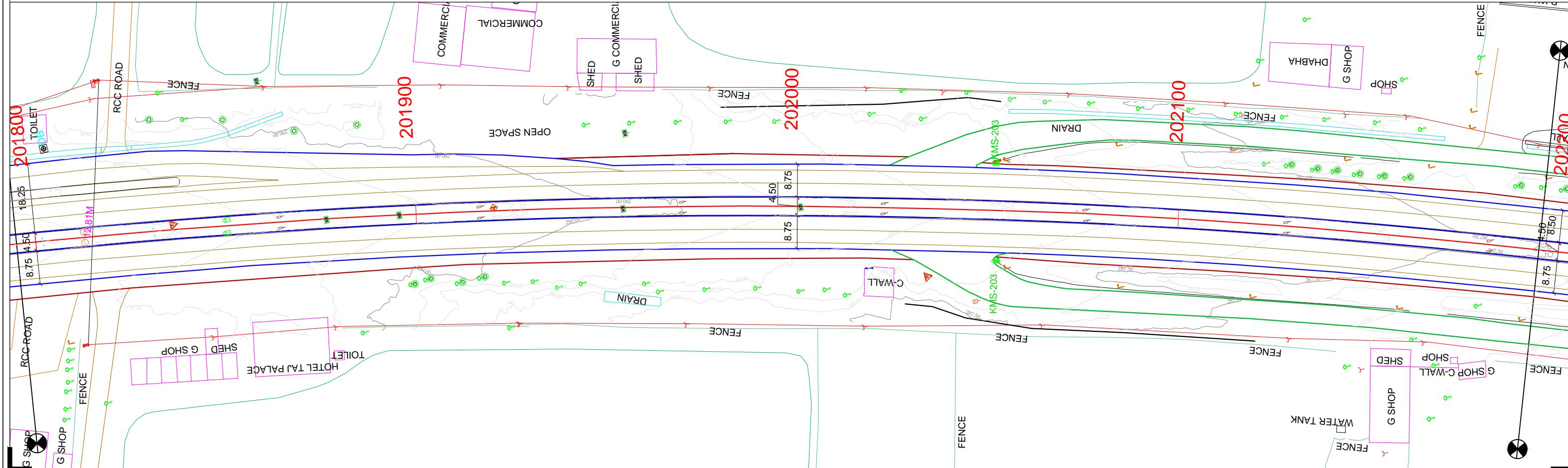
TITLE:- KMS 201/000 TO 201/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
83	1 : 1000	A3	0





<<< TO KOTHAKOTA

(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>



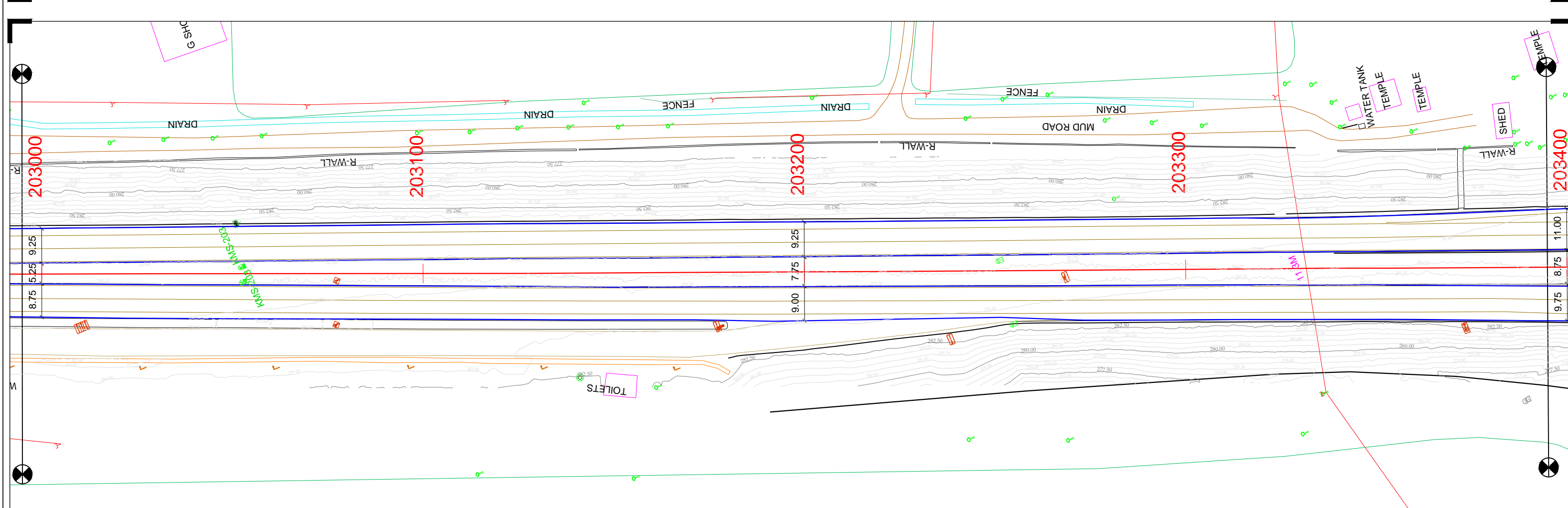
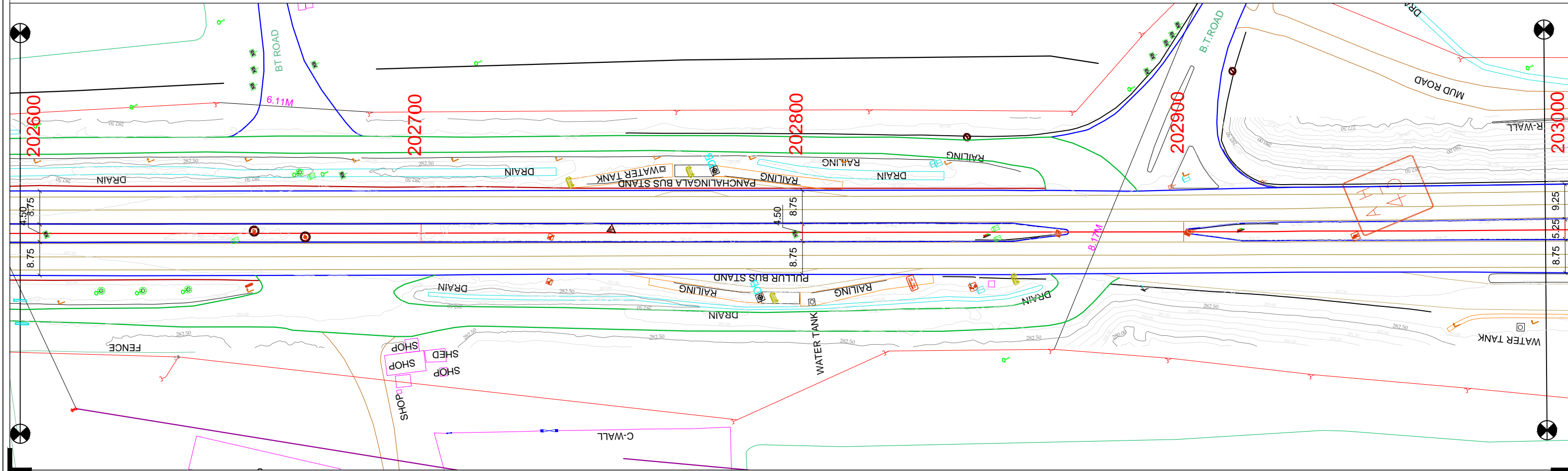
			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:- TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 201/800 TO 202/600					
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S					
				CHECKED BY				SHEET NO.					
				APPROVED BY				SCALE					
REV	DATE	DESCRIPTION OF REVISIONS						SIZE					
								REV					
								84	1 : 1000	A3	0		





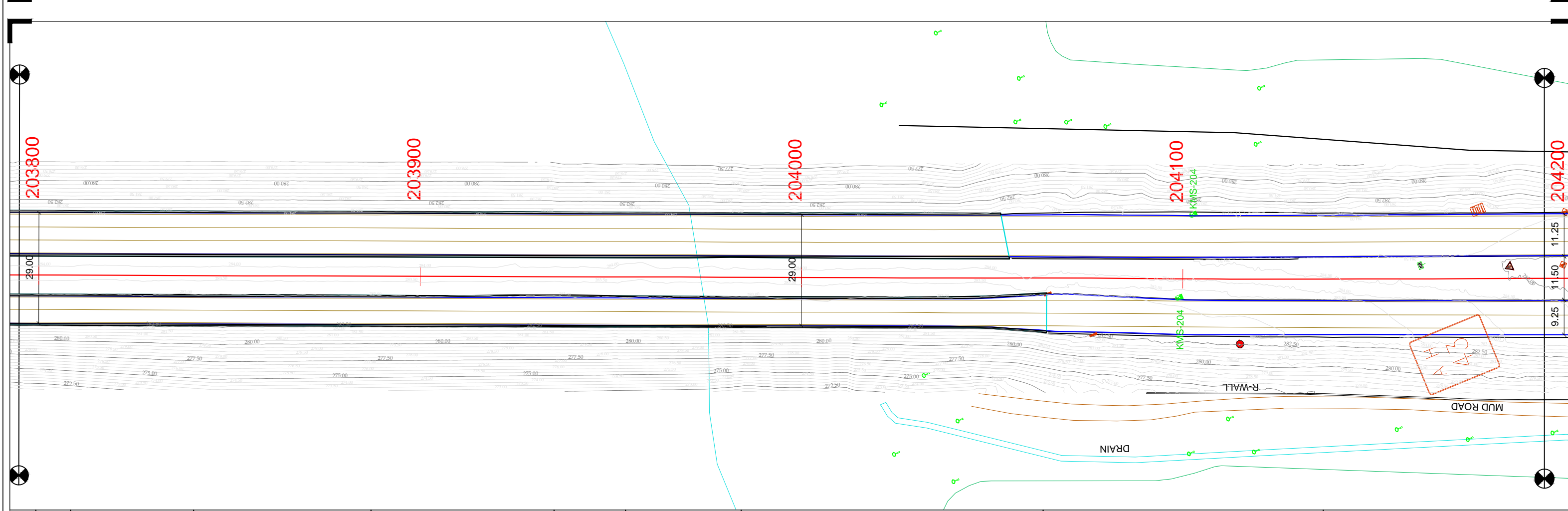
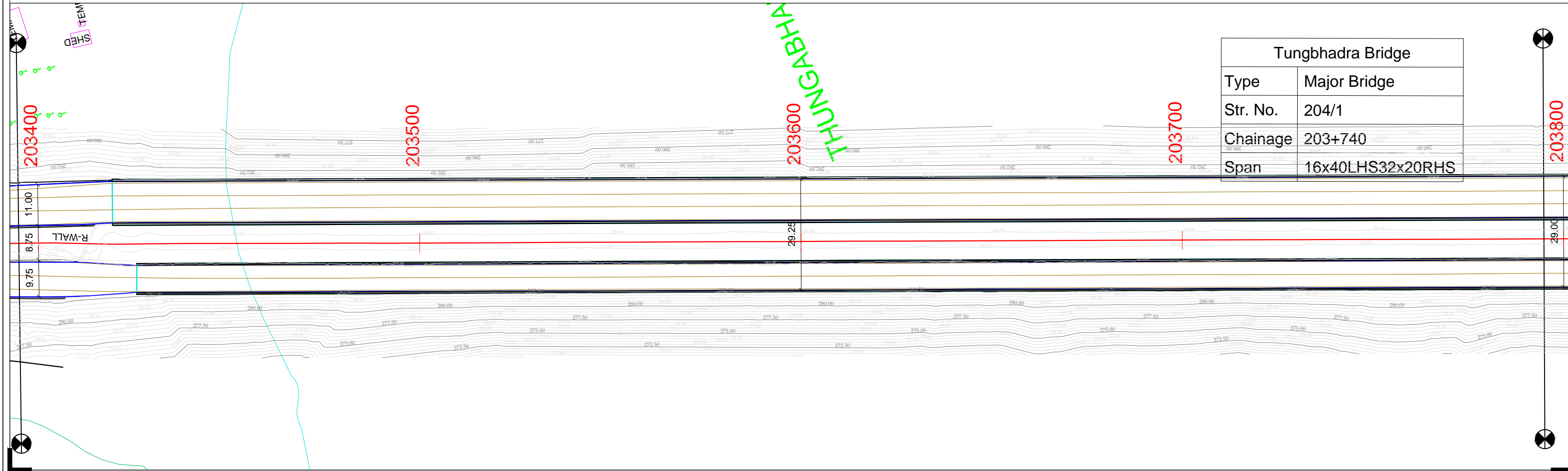
<<< TO KOTHAKOTA



(KOTHAKOTA BYPASS - KURNOOL) TOPOGRAPHICAL SURVEY MAP

TO KURNOOL >>>

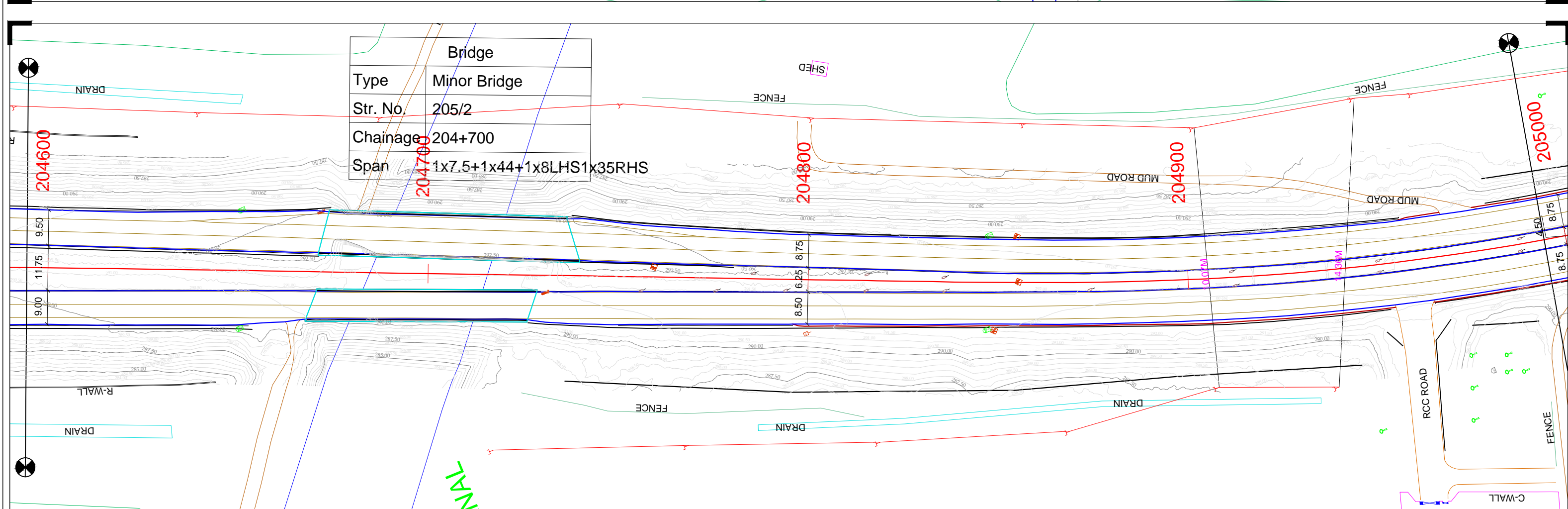


			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 202/600 TO 203/400			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				85 1 : 1000 A3 0			






			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYP SA in JV with AVANZA Engineering Pvt. Ltd. </div>	<div>PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 203/400 TO 204/200			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. 86			
				APPROVED BY				SCALE 1 : 1000			
REV	DATE	DESCRIPTION OF REVISIONS							SIZE A3 REV 0		

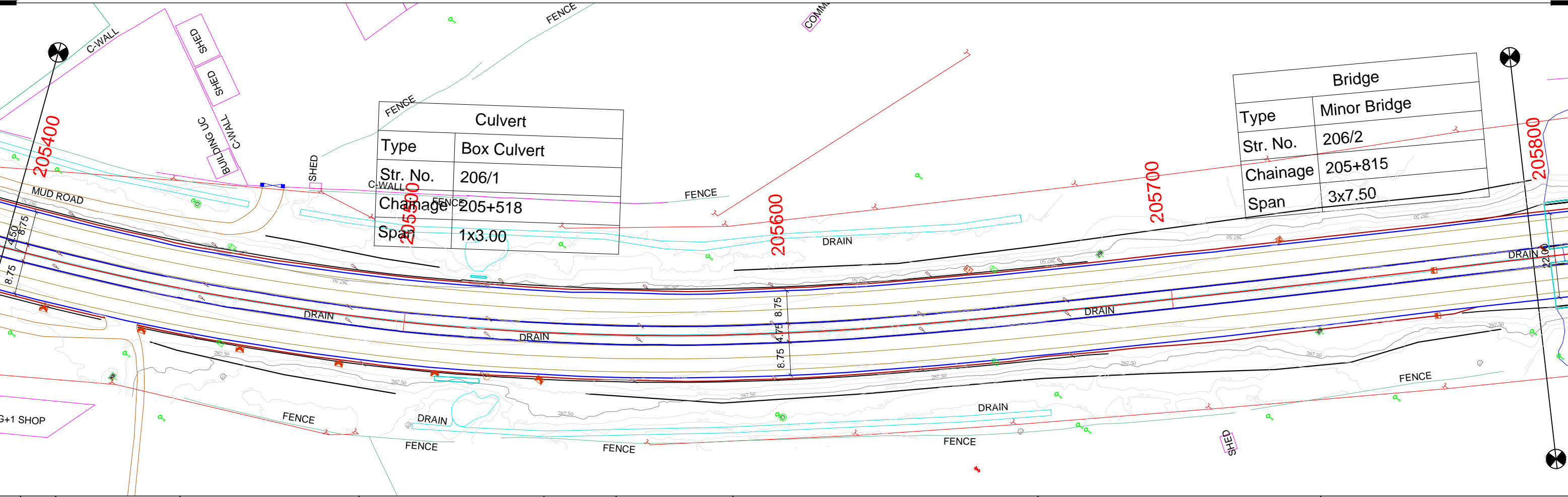
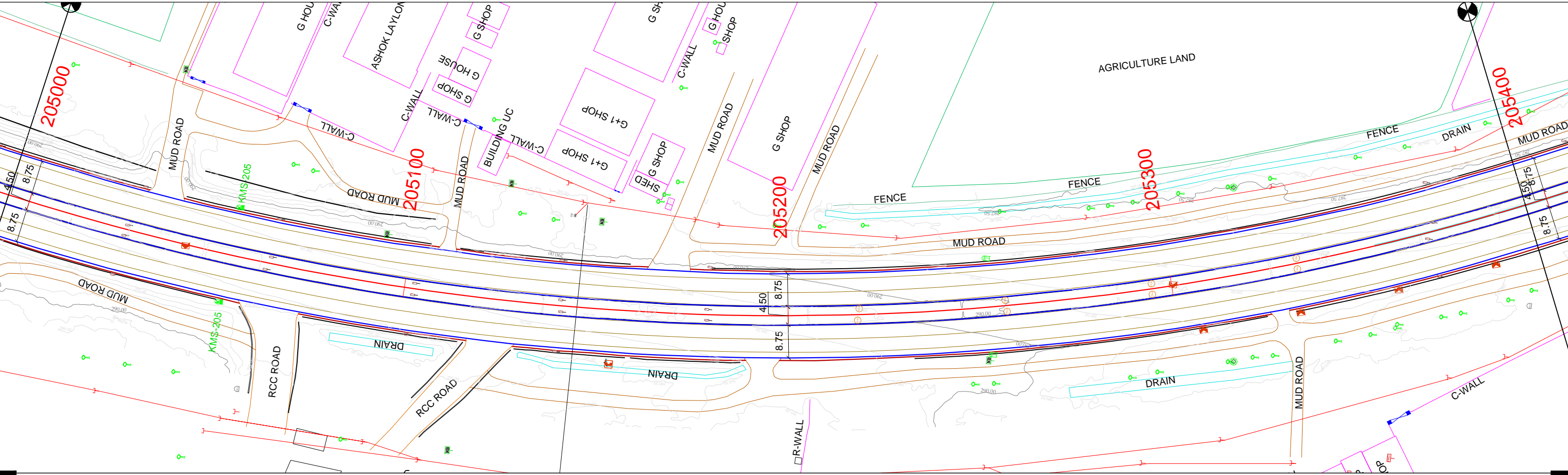




Underpass	
Type	VUP
Str. No.	205/1
Chainage	204+465
Span	1x22.5LHS1x6+1x22.5+1x6RHS

Bridge	
Type	Minor Bridge
Str. No.	205/2
Chainage	204+700
Span	1x7.5+1x44+1x8LHS1x35RHS


			CLIENT :-  <b>NATIONAL HIGHWAY AUTHORITY OF INDIA</b>	DRAWN BY		CONSULTANT:-  <b>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</b> 	PROJECT :- <b>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</b>	TITLE:- <b>KMS 204/200 TO 205/000</b>			
				DESIGN BY				DRAWING NO. <b>AV_TYPSA/NHAI/InvIT/TOPO_5</b>			
				CHECKED BY				SHEET NO. <b>87</b>			
				APPROVED BY				SCALE	SIZE	REV	
REV	DATE	DESCRIPTION OF REVISIONS						1 : 1000	A3	0	



REV	DATE	DESCRIPTION OF REVISIONS

CLIENT :-  
  
**NATIONAL HIGHWAY  
AUTHORITY OF INDIA**

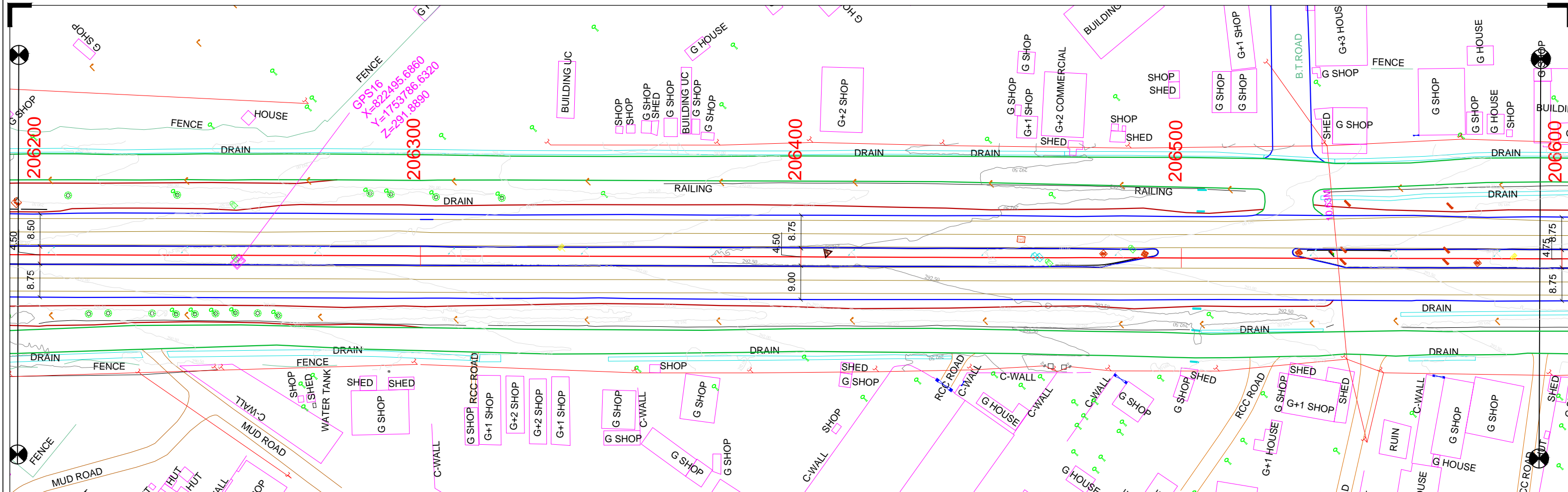
DRAWN BY	
DESIGN BY	
CHECKED BY	
APPROVED BY	



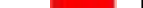
CONSULTANT:-  
**TYPSA in JV with  
AVANZA Engineering Pvt. Ltd.**  


PROJECT :-  
**Preparation of Report on Physical Condition  
of the National Highways on Roads under  
(InvIT) Model**

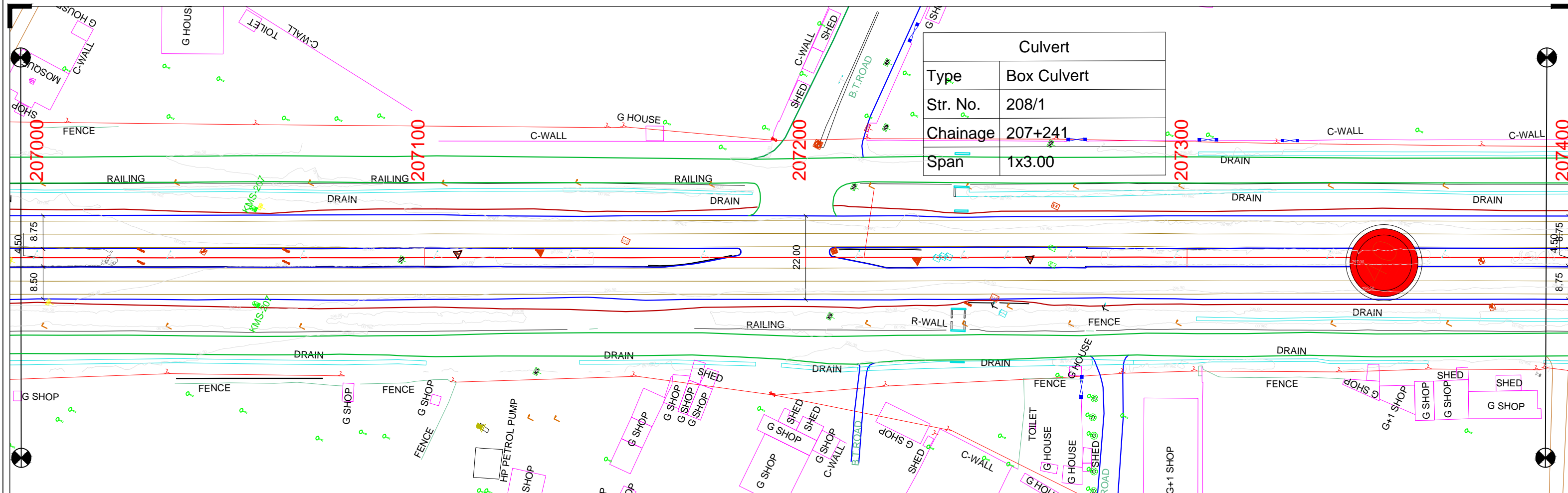
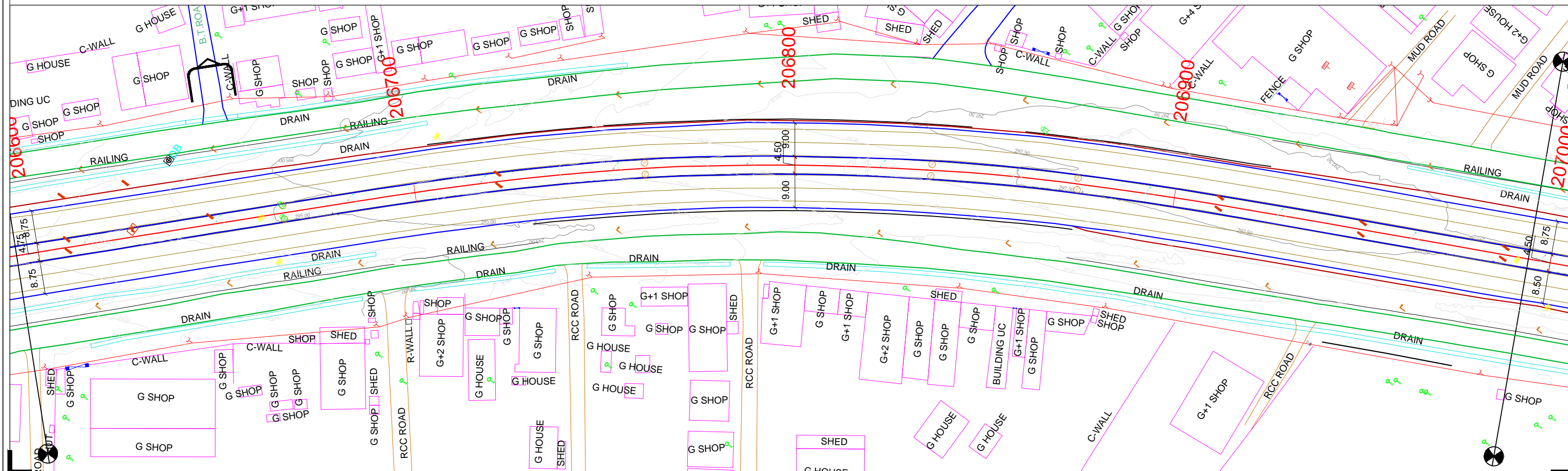
TITLE:- KMS 205/000 TO 205/800			
DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
SHEET NO.	SCALE	SIZE	REV
88	1 : 1000	A3	0



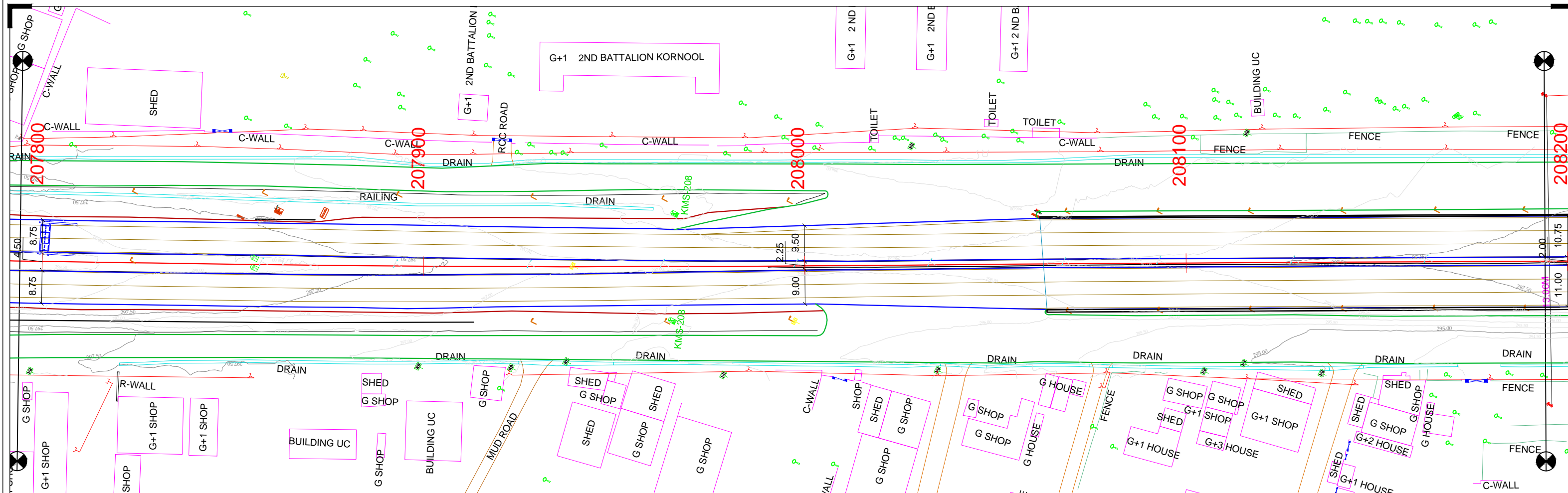
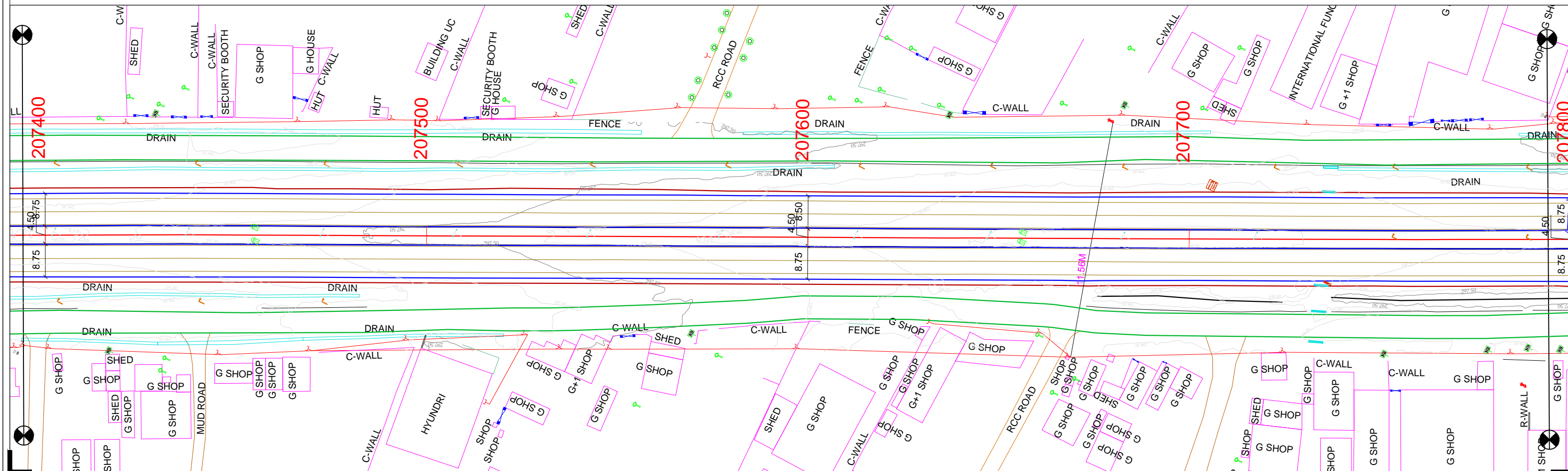





			<p>CLIENT :-</p>  <p>NATIONAL HIGHWAY AUTHORITY OF INDIA</p>	DRAWN BY		<p>CONSULTANT:-</p> <p>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</p>  	<p>PROJECT :-</p> <p>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</p>	TITLE:- KMS 205/800 TO 206/600			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.	SCALE	SIZE	REV
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY							
								89	1 : 1000	A3	0



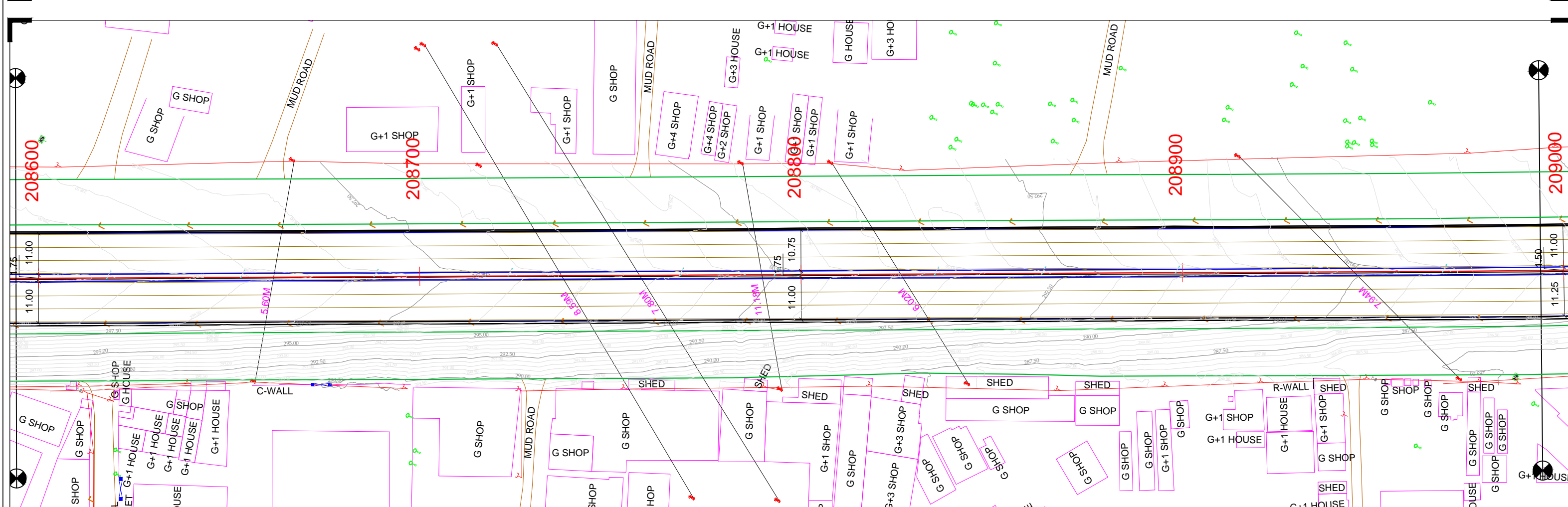
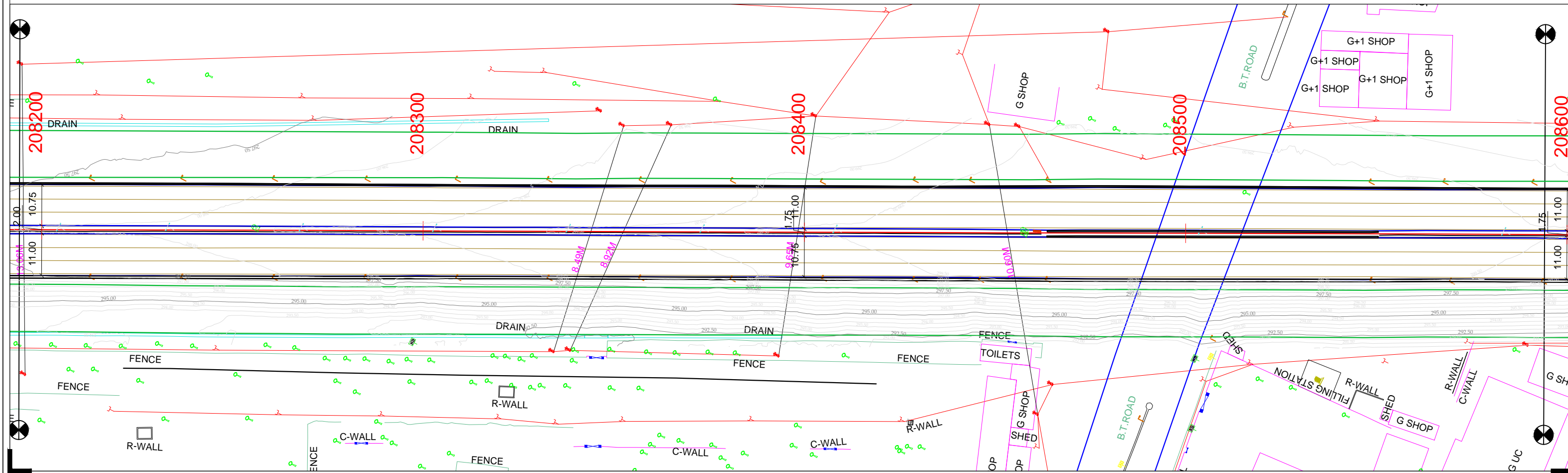





Culvert	
Type	Box Culvert
Str. No.	208/1
Chainage	207+241
Span	1x3.00

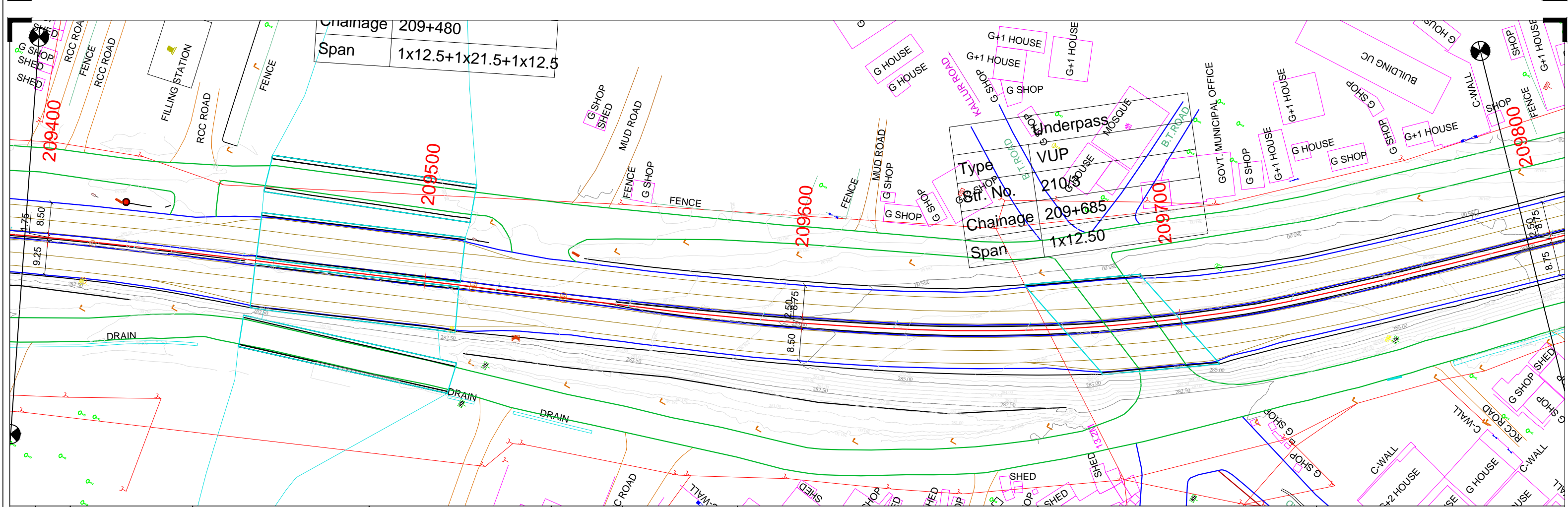
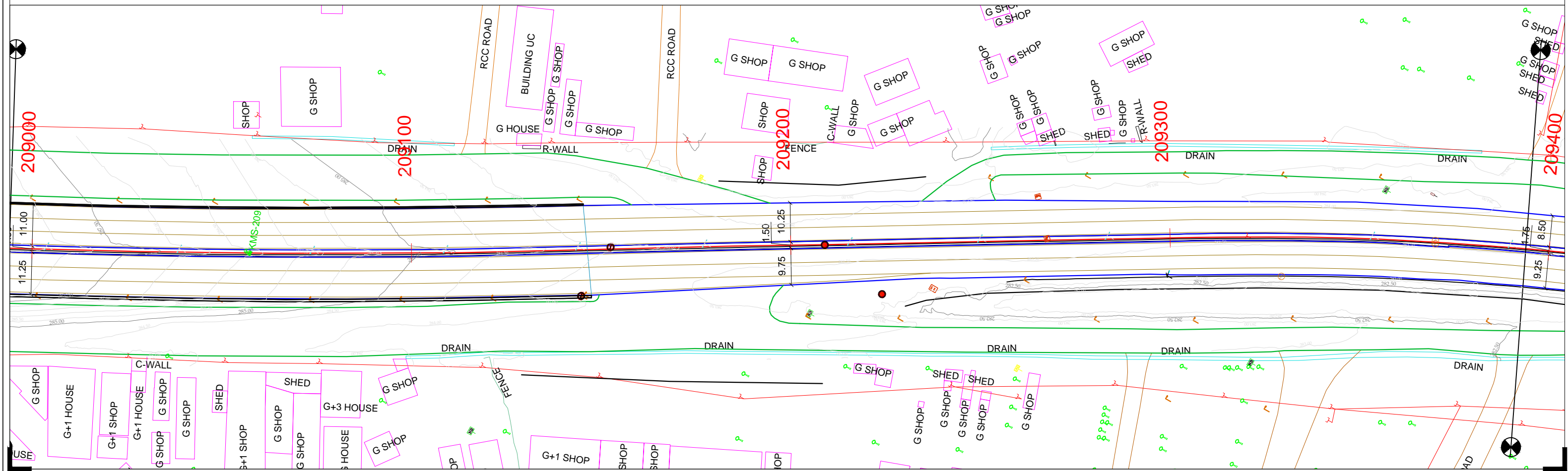





			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 207/ 400 TO 208/200			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO. SCALE SIZE REV			
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				91 1 : 1000 A3 0			



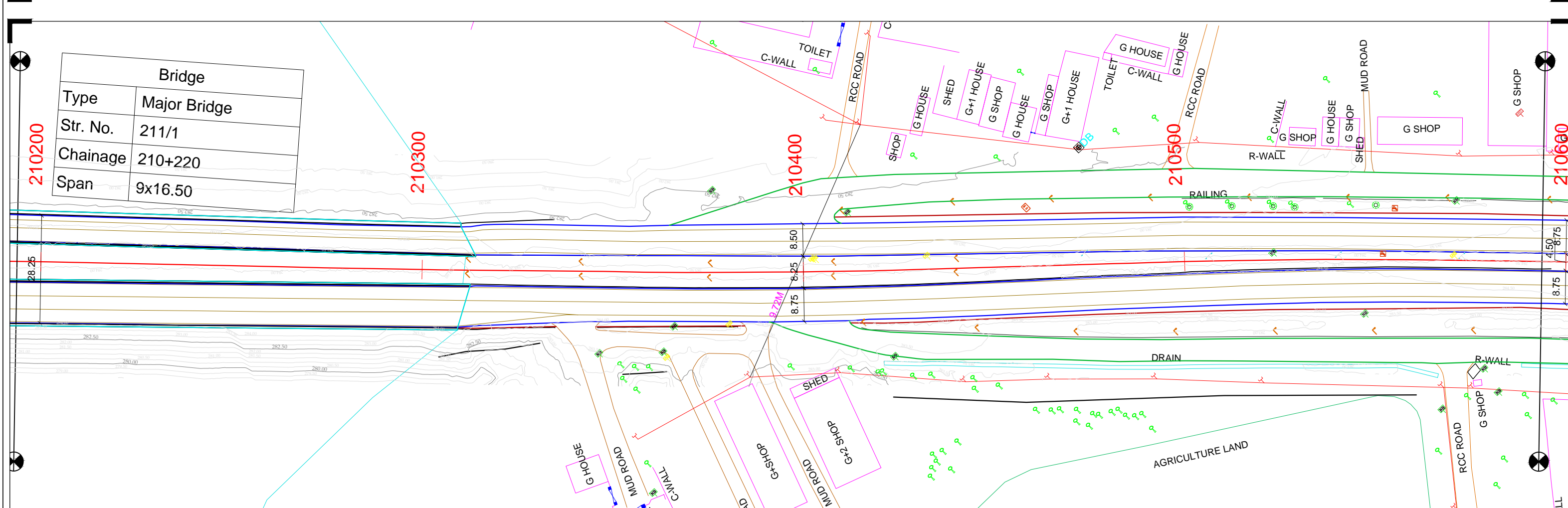
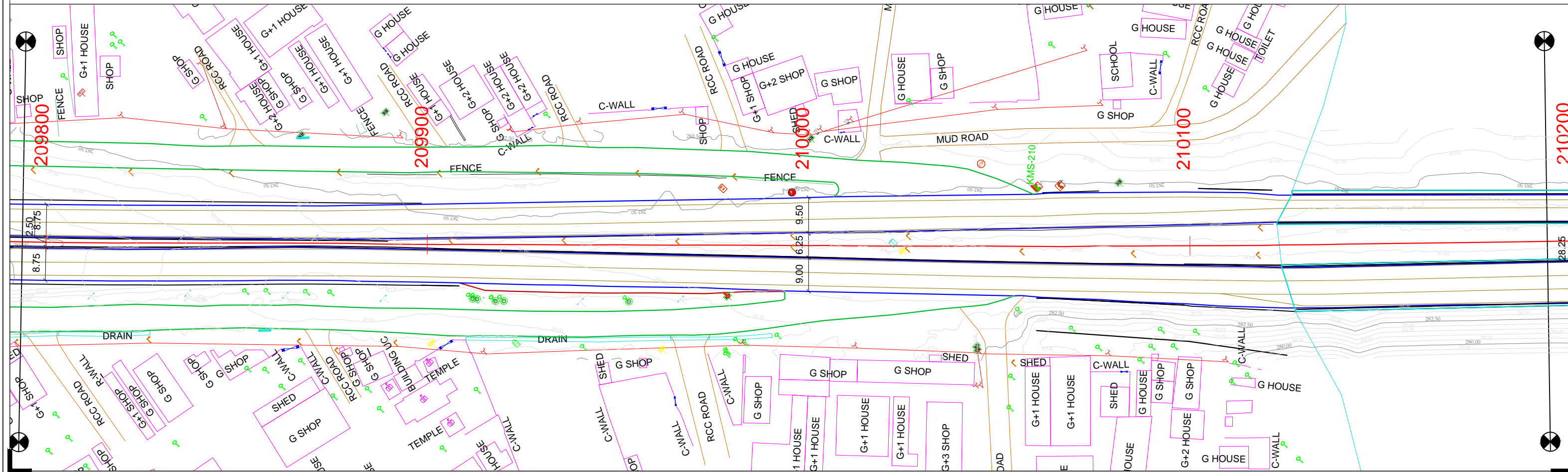


			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSPA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	PROJECT :- Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 208/200 TO 209/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE	SIZE	REV	
REV	DATE	DESCRIPTION OF REVISIONS						6420	92	1 : 1000	A3



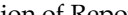


			<div>CLIENT :-</div> <div></div> <div>NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-</div> <div>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</div> <div> </div>	<div>PROJECT :-</div> <div>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</div>	TITLE:- KMS 209/000 TO 209/800			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
				CHECKED BY				SHEET NO.			
				APPROVED BY				SCALE			
REV	DATE	DESCRIPTION OF REVISIONS								SIZE	
							REV				
							93				
							1 : 1000				
							A3				
							0				

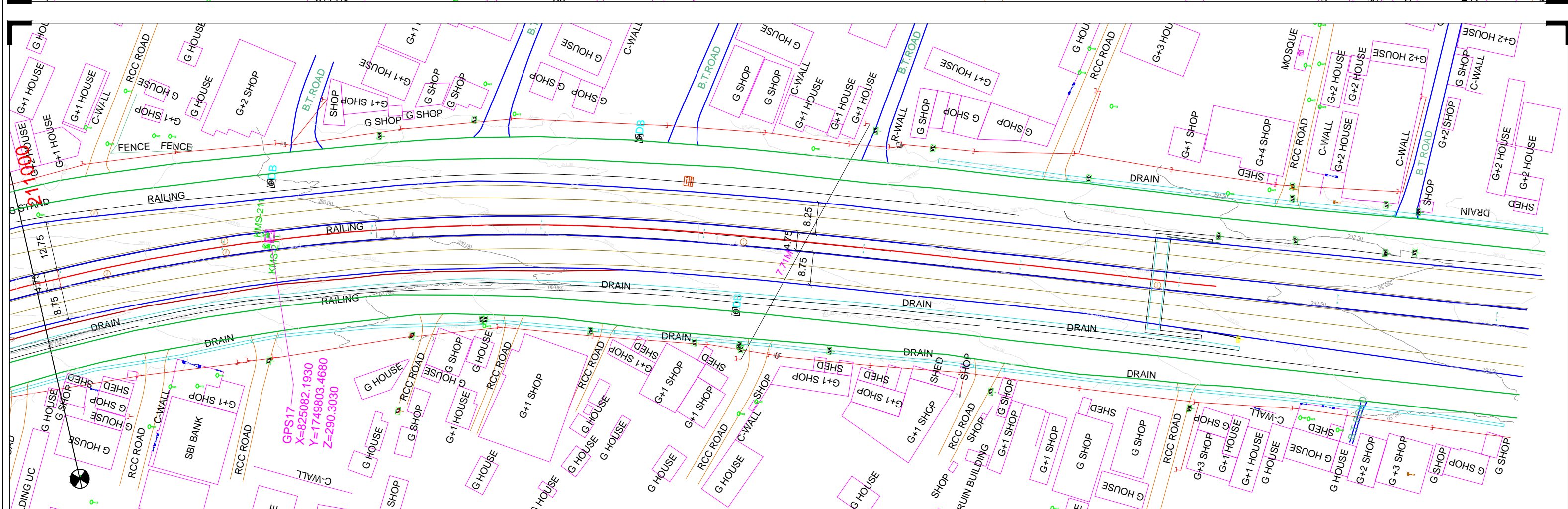







Bridge	
Type	Major Bridge
Str. No.	211/1
Chainage	210+220
Span	9x16.50

			<div>CLIENT :-  NATIONAL HIGHWAY AUTHORITY OF INDIA</div>	DRAWN BY		<div>CONSULTANT:-  TYPSPA in JV with AVANZA Engineering Pvt. Ltd.  </div>	PROJECT :-  Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model	TITLE:- KMS 209/800 TO 210/600			
								DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_S			
REV	DATE	DESCRIPTION OF REVISIONS			APPROVED BY						94





			<p>CLIENT :-</p>  <p>NATIONAL HIGHWAY AUTHORITY OF INDIA</p>	DRAWN BY		<p>CONSULTANT:-</p> <p>TYPSA in JV with AVANZA Engineering Pvt. Ltd.</p>  	<p>PROJECT :-</p> <p>Preparation of Report on Physical Condition of the National Highways on Roads under (InvIT) Model</p>	TITLE:- KMS 210/600 TO 211/000			
				DESIGN BY				DRAWING NO. AV_TYPSA/NHAI/InvIT/TOPO_5			
				CHECKED BY				SHEET NO.	SCALE	SIZE	REV
REV	DATE	DESCRIPTION OF REVISIONS		APPROVED BY				95	1 : 1000	A3	0

## **ANNEXURE C**

### **TRAFFIC CONSULTANT REPORTS**

*(The remainder of this page has intentionally been kept blank)*

# Project Speed: Traffic & Revenue Due Diligence

---





# Project Speed: Traffic & Revenue Due Diligence



Prepared by:

Vaibhav Gupta  
Suite No. S3, Vatika Business  
Centre,  
Vatika Triangle, MG Road,  
Gurgaon, Haryana, 122002,  
India

+91 124 441 8650  
[www.steergroup.com](http://www.steergroup.com)

Prepared for:

National Highways Infra Investment Managers  
Private Limited  
G - 5 & 6, Sector 10,  
Dwarka,  
New Delhi – 110075

Client ref: Project Speed  
Our ref: 24033901



## Contents

<b>Disclaimer .....</b>	<b>7</b>
<b>Glossary Items.....</b>	<b>9</b>
<b>1 Introduction.....</b>	<b>10</b>
The assignment .....	10
Our approach.....	11
Contents of this Report .....	12
<b>2 The Assets .....</b>	<b>13</b>
Introduction.....	13
Asset 1 (Palanpur-Abu Road) and Asset 2 (Abu Road-Swaroopganj).....	14
Asset 3 (Belgaum-Kagal road).....	17
<b>3 Current and historical traffic and revenue analysis .....</b>	<b>22</b>
Introduction.....	22
Historical traffic and revenue analysis from various sources.....	24
Electronic Toll Collection .....	36
Toll segmentation.....	39
Historical revenues .....	41
Summary.....	43
<b>4 Base Traffic, Revenue and Growth Validation .....</b>	<b>44</b>
Introduction.....	44
Base traffic validation.....	44
Revenue validation .....	49
Growth validation.....	52
Forecast summary for background elasticities.....	55
Forecasts for growth drivers .....	56
<b>5 Traffic and revenue forecasts .....</b>	<b>60</b>
Introduction.....	60
Forecast impacts.....	60
Revenue forecasting assumptions.....	69
Traffic and Revenue forecasts .....	76

Summary.....	91
--------------	----

## Figures

Figure 2.1: Asset locations .....	13
Figure 2.2: Location of Asset and toll plaza .....	15
Figure 2.3: Asset 1 & 2 and surrounding highway network .....	17
Figure 2.4: Location of Asset 3 and toll plazas.....	18
Figure 2.5: Asset 3 and surrounding highway network .....	21
Figure 3.1: Historical traffic counts - WADT* .....	25
Figure 3.2: Historical traffic counts - WADT* .....	26
Figure 3.3: Historical MADT (Schedule-M) on Asset 1 Khemana.....	27
Figure 3.4: Historical MADT (Schedule-M) on Asset 2 Undavariya .....	27
Figure 3.5: Historical monthly traffic profile on BPP Toll Plaza 4 .....	29
Figure 3.6: Historical traffic counts - WADT* .....	31
Figure 3.7: Historical traffic counts - WADT* .....	32
Figure 3.8: Historical MADT (Schedule-M) on Asset 3 Kognoli.....	32
Figure 3.9: Historical MADT (Schedule-M) on Asset 3 TP2 Hattargi.....	33
Figure 3.10: Historical traffic on Belgaum-Dharwad .....	35
Figure 3.11: Proportion of Schedule-M traffic using fast tag/ETC, Asset 1 Khemana .....	36
Figure 3.12: Proportion of Schedule-M traffic using fast tag/ETC, Asset 2 Undavariya.....	37
Figure 3.13: Proportion of Schedule-M traffic using fast tag/ETC, Asset 3 Kognoli .....	38
Figure 3.14: Proportion of Schedule-M traffic using fast tag/ETC, Asset 3 Hattargi .....	38
Figure 3.15: Segmentation from Schedule-M data on Khemana toll plaza.....	39
Figure 3.16: Segmentation from Schedule-M data on Undavariya toll plaza .....	40
Figure 3.17: Segmentation from Schedule-M data on Kognoli toll plaza .....	40
Figure 3.18: Segmentation from Schedule-M data on Hattargi toll plaza.....	41
Figure 3.19: Historical revenues on Asset 1 TP1 Khemana .....	41
Figure 3.20: Historical revenues on Asset 2 TP1 Undavariya .....	42
Figure 3.21: Historical revenues on Asset 3 TP1 Kognoli.....	42
Figure 3.22: Historical revenues on Asset 3 TP2 Hattargi.....	43
Figure 4.1: Adopted FY21 segmentation for Khemana toll plaza .....	50
Figure 4.2: Adopted FY21 segmentation for Undavariya toll plaza .....	50

Figure 4.3: Adopted FY21 segmentation for Kognoli toll plaza .....	51
Figure 4.4: Adopted FY21 segmentation for Hattargi toll plaza .....	52
Figure 4.5: Global economic standing in February 2021 .....	57
Figure 4.6: Steer composite GDP line shown with various forecast sources .....	58
Figure 4.7: Comparison of historical GSDP growth and GDP growth .....	58
Figure 5.1: Route analysis via Alt 1 (via Asset) and Alt 2 for Asset 1 and 2 .....	63
Figure 5.2: Alternate routes and Asset route shown against the regional network context on Asset 3.....	67
Figure 5.3: Evolution of CJV toll segmentation in the short term, A1 TP1 Khemana .....	72
Figure 5.4: Evolution of MAV toll segmentation in the short term, A1 TP1 Khemana.....	72
Figure 5.5: Evolution of CJV toll segmentation in the short term, A2 TP1 Undavariya .....	73
Figure 5.6: Evolution of MAV toll segmentation in the short term, A2 TP1 Undavariya.....	73
Figure 5.7: Evolution of CJV toll segmentation in the short term, A3 TP1 Kognoli .....	74
Figure 5.8: Evolution of MAV toll segmentation in the short term, A3 TP1 Kognoli.....	74
Figure 5.9: Evolution of CJV toll segmentation in the short term, A3 TP2 Hattargi .....	75
Figure 5.10: Evolution of MAV toll segmentation in the short term, A3 TP2 Hattargi.....	75
Figure 5.11: Asset 1, Base PCU as compared to Upside and Downside scenarios .....	89
Figure 5.12: Asset 2, Base PCU as compared to Upside and Downside scenarios .....	89
Figure 5.13: Asset 3 Kognoli, Base PCU as compared to Upside and Downside scenarios .....	90
Figure 5.14: Asset 3 Hattargi, Base PCU as compared to Upside and Downside scenarios .....	90

## Tables

Table 2.1: Description of Assets .....	14
Table 2.2: FY21 toll rates on Assets 1 and 2 (INR) .....	15
Table 2.3: FY21 toll rates on Asset 3 (INR).....	18
Table 2.4: Revised tollable length post 6-Laning of the Asset 3.....	19
Table 3.1: Summary of the data available .....	24
Table 3.2: Historical counts (IIHMCL) on A1 Khemana toll plaza and CAGR .....	25
Table 3.3: Historical counts (IIHMCL) on A2 Undavariya toll plaza and CAGR .....	26
Table 3.4: Schedule-M data points for Asset 1 and 2.....	28
Table 3.5: Historical counts (DPR) on Asset 1 Khemana toll plaza .....	28
Table 3.6: Historical counts (DPR) on Asset 2 Undavariya toll plaza .....	28

Table 3.7: Historical traffic performance of BPP toll plaza 4.....	29
Table 3.8: Historical IHMCL counts on TP1 Kognoli toll plaza .....	30
Table 3.9: Historical IHMCL counts on Hattargi toll plaza .....	31
Table 3.10: Schedule M data points for Asset 3 .....	33
Table 3.11: Historical counts (IE report) on Asset 3 .....	34
Table 3.12: Historical counts (DPR) for Nov-20 on Asset 3 .....	34
Table 3.13: Historical counts on toll plaza and CAGR.....	35
Table 3.14: Timeline of national ETC implementation .....	36
Table 4.1: Asset 1 TP1 Khemana comparison of available counts in FY21 (November 2020) ...	45
Table 4.2: Asset 2 TP1 Undavariya comparison of available counts in FY21 (November 2020)	45
Table 4.3: SCFs derived from various sources and the adopted SCFs .....	46
Table 4.4: Asset 1 and Asset 2 base AADT (FY21) estimates .....	47
Table 4.5: Asset 3 TP1 Kognoli comparison of available counts in FY21 (November 2020).....	47
Table 4.6: Asset 3 TP3 Hattargi comparison of available counts in FY21 (November 2020).....	48
Table 4.7: SCFs derived from various sources and the adopted SCFs .....	48
Table 4.8: Asset 3 base AADT (FY21) estimates.....	49
Table 4.9: Difference in Schedule-M traffic volume and counts for November-20 used to estimate FY21 AADT .....	49
Table 4.10: FY21 revenue (INR Crore) estimates as compared to sources, Asset 1 and 2 .....	51
Table 4.11: FY21 revenue estimates as compared to sources, Asset 3 .....	52
Table 4.12: Identified growth drivers to model traffic growth at Asset 1 TP1 Khemana and Asset 2 TP1 Undavariya .....	53
Table 4.13: Elasticity recommendations for Asset 1 and Asset 2 .....	53
Table 4.14: Identified growth drivers to model traffic growth at A3 TP1 Kognoli and TP2 Hattargi .....	54
Table 4.15: Elasticity recommendations for Asset 3 .....	55
Table 4.16: Assumed forecast elasticities for background growth forecasts.....	56
Table 5.1: Key intermediate and final outputs in the forecast.....	60
Table 5.2: List of network/other developments.....	61
Table 5.3: Costs for MAV on the Asset and alternate routes compared for the current and post-upgrade scenarios.....	63
Table 5.4: Estimated impacts on A1 and A2 due to Udaipur-Sirohi-Tharad upgrade .....	64
Table 5.5: Status of WDFC sections .....	64
Table 5.6: Estimated impacts on A1 and A2 due to completion of WDFC .....	65

Table 5.7: Estimated impacts on A1 and A2 due to LOS improvement.....	66
Table 5.8: Network development and status on the Mumbai-Bangalore-Chennai corridor network.....	66
Table 5.9: Estimated network development impacts on Pune-Bangalore traffic market on A3 – Bangalore market .....	68
Table 5.10: Estimated network development impacts on Pune-Bangalore traffic market on A3– Chennai market .....	68
Table 5.11: Estimated impacts on A3 due to LOS improvement.....	69
Table 5.12: WPI growth forecast assumptions.....	70
Table 5.13: Toll estimation overview.....	70
Table 5.14: Toll segmentation for the forecast year FY23.....	71
Table 5.15: Traffic forecast, A1 TP1 Khemana.....	76
Table 5.16: Traffic growth rates (%), A1 TP1 Khemana .....	76
Table 5.17: Revenue (INR crore), A1 TP1 Khemana.....	76
Table 5.18: Traffic forecast, A2 TP1 Undavariya.....	77
Table 5.19: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya .....	77
Table 5.20: Revenue (INR Crore), A2 TP1 Undavariya .....	77
Table 5.21: Traffic forecast, A3 TP1 Kognoli.....	78
Table 5.22: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli.....	78
Table 5.23: Revenue (INR Crore), A3 TP1 Kognoli .....	78
Table 5.24: Traffic forecast, A3 TP2 Hattargi.....	79
Table 5.25: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi.....	79
Table 5.26: Revenue (INR Crore), A3 TP2 Hattargi .....	79
Table 5.27: Summary of upside and downside assumptions .....	80
Table 5.28: Traffic forecast, A1 TP1 Khemana.....	81
Table 5.29: Traffic growth rates (%), A1 TP1 Khemana .....	81
Table 5.30: Revenue (INR crore), A1 TP1 Khemana.....	81
Table 5.31: Traffic forecast, A2 TP1 Undavariya.....	82
Table 5.32: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya .....	82
Table 5.33: Revenue (INR Crore), A2 TP1 Undavariya .....	82
Table 5.34: Traffic forecast, A3 TP1 Kognoli.....	83
Table 5.35: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli.....	83
Table 5.36: Revenue (INR Crore), A3 TP1 Kognoli .....	83



Table 5.37: Traffic forecast, A3 TP2 Hattargi.....	84
Table 5.38: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi.....	84
Table 5.39: Revenue (INR Crore), A3 TP2 Hattargi .....	84
Table 5.40: Traffic forecast, A1 TP1 Khemana.....	85
Table 5.41: Traffic growth rates (%), A1 TP1 Khemana .....	85
Table 5.42: Revenue (INR crore), A1 TP1 Khemana.....	85
Table 5.43: Traffic forecast, A2 TP1 Undavariya.....	86
Table 5.44: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya .....	86
Table 5.45: Revenue (INR Crore), A2 TP1 Undavariya .....	86
Table 5.46: Traffic forecast, A3 TP1 Kognoli.....	87
Table 5.47: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli.....	87
Table 5.48: Revenue (INR Crore), A3 TP1 Kognoli .....	87
Table 5.49: Traffic forecast, A3 TP2 Hattargi.....	88
Table 5.50: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi.....	88
Table 5.51: Revenue (INR Crore), A3 TP2 Hattargi .....	88

## Disclaimer

This Report was prepared by Steer, Davies & Gleave India Private Limited (the “Traffic Consultant”) for the benefit of NHAIIIMPL (the “Client”) solely in its capacity as the Traffic Advisor for the Project Speed (the “Project”) pursuant to an engagement letter and related schedules (collectively, the “Agreement”), dated 25<sup>th</sup> of March 2021. This Report, information contained herein and any statements contained within are all based upon information provided to the Traffic Consultant, and obtained from proprietary data purchased or confidential information provided by the Client, from publicly available information or sources, in the course of evaluations of the Project. The Traffic Consultant provides no assurance as to the accuracy of any such third-party information and bears no responsibility for the results of any actions taken on the basis of the third-party information contained in the Report, except to the extent that such actions result from the wilful misconduct, recklessness, fraud or gross negligence of the Traffic Consultant.

Certain forward-looking statements are based upon interpretations or assessments of information at the time of writing. Actual events may differ from those assumed, and events are subject to change. Findings are time-sensitive and relevant only to current conditions at the time of writing. The Report speak only as of the date of issuance and the Traffic Consultant undertakes no obligation to update the Report for any reason. Factors influencing the accuracy and completeness of the forward-looking statements may exist that are outside of the purview or control of the Traffic Consultant. The Traffic Consultant makes or provides no warranty, whether implied or otherwise, as to the accuracy of the forward-looking information presented, nor does it take any responsibility or bear any liability whatsoever as to the actions taken by others, including third parties, based upon the forward-looking statements made in the Report, except to the extent that such actions result from the wilful misconduct, recklessness, fraud or gross negligence of the Traffic Consultant. The Traffic Consultant’s Report is thus to be viewed as an assessment that is time-relevant, specifically referring to conditions at the time of review.

The Traffic Consultant developed the relationships in the models used to produce the forecasts for this Project based on data provided through December 2020. Since March 2020, the outbreak of the virus known as COVID- 19 has spread throughout the world and has been defined by the World Health Organization as a “pandemic”. As of the date of distribution of this Report, the COVID-19 outbreak is having a material impact on global economic and political affairs including having a significant impact on all the transportation industries, including toll road traffic, where in particular vehicle volumes have fallen in response to quarantine and self-care measures that governments have imposed. The situation remains dynamic and is subject to significant change. In this challenging context, Traffic Consultant has produced base forecasts (directly produced from models using a combination of pre-COVID-19 and post-COVID-19 views) with a view on a possible scenario for the traffic forecasts based on an assumption of recovery from the COVID-19-related traffic decrease. For the purposes of these forecasts, we have also incorporated other possible impacts of COVID-19 related scenarios. However, it is important to note that this is only one view, and there continues to remain uncertainty as to the short-term, intermediate or prolonged effects of and responses to the COVID-19 pandemic on the Project. All of these effects could impact the COVID-19-related aspects of the Report. As a result, no assurance can be provided by Traffic Consultant that the scenarios and assumptions Traffic Consultant has identified will prove to be accurate. Given the uncertainty inherent in this unprecedented pandemic, Traffic Consultant advises that all readers of the Report consider the Report in the context of their own assessment of

the COVID-19 outbreak and its current and potential impacts before making final decisions related to this Project.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE LIABILITY OF THE TRAFFIC CONSULTANT FOR ANY LOSS, DAMAGE, COST OR EXPENSE SUFFERED OR INCURRED BY ALL PERSONS OR ENTITIES AND FOR ALL CLAIMS RESPECTING ITS WORK PERFORMED IN CONNECTION WITH THE OFFER OR THE REPORT PROJECT IS HEREBY LIMITED IN THE AGGREGATE TO THE AMOUNT OF FEES ACTUALLY PAID BY THE CLIENT TO THE TRAFFIC CONSULTANT IN RESPECT OF THE REPORT AND CONNECTED SERVICES CONNECTION WITH THE PROJECT.

## Glossary Items

Acronym	Meaning
AADT	Annual Average Daily Traffic
BOT	Build Operate Transfer
CJV	Cars / Jeeps / Vans
COD	Commercial Operations Date
DPR	Detailed Project Report
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
FY	Financial Year
HAM	Hybrid Annuity Model
HCM	Heavy Commercial Vehicles
IHMCL	Indian Highway Management Company Limited
InvIT	Infrastructure Investment Trust
LCV	Light Commercial Vehicles
MAV	Multi Axle Vehicle
NH	National Highway
NHAI	National Highways Authority of India
NHIIMPL	National Highways Infra Investment Managers Private Limited
NSDP	National State Domestic Production
OD	Origin Destination
RNP	Registered Number Plate
SCF	Seasonality Correction Factors
SH	State Highway
T&R	Traffic and Revenue
TMS	Traffic Management System
TVC	Traffic Volume Count
YTD	Year to Date

# 1 Introduction

## The assignment

- 1.1 National Highways Infra Investment Managers Private Limited (**'NHIIMPL'** or the **'Client'**) has commissioned Steer Davies Gleave India Private Limited (hereafter called **'Steer'**) for a traffic assessment study in January 2021 for the following three Assets (**'Assets'** or **"A"**). These Assets include a total of four toll plazas between them:
  - **Asset 1:** Palanpur – Abu Road section of NH 27 from KM 340+000 to KM 295+000, in the states of Gujarat and Rajasthan;
  - **Asset 2:** Abu Road – Swaroopganj section of NH 27 from KM 264+000 to KM 295+000, in the state of Rajasthan; and
  - **Asset 3:** Belgaum – Kagal section of NH 48 from KM 592+240 to KM 515+000, in the state of Karnataka and Maharashtra. This Asset has 2 toll plazas.
- 1.2 The National Highways Authority of India (**'NHA'**) has set up an Infrastructure Investment Trust (**'InvIT'**) namely National Highways Infra Trust and is acting as its Sponsor to the said InvIT. The NHIIMPL has been incorporated and appointed as the Investment Manager for the proposed InvIT by NHA.
- 1.3 As part of the first stage of setting up the InvIT, a total of five road projects have been identified by NHA and NHIIMPL for transfer to InvIT. Steer is responsible for conducting traffic assessment on three Assets mentioned above.
- 1.4 Detailed technical and traffic feasibility studies for these roads have been conducted recently by a NHIIMPL consultant and its reports (**'Base Reports'** or hereafter called **'DPR'**) were made available as part of this study.
- 1.5 Our scope of work includes the following:
  - Review of Base Report/DPR including review of included traffic data – traffic volume counts and travel patterns based on OD survey data;
  - Analysis of toll/traffic data and study appropriateness of methodology used in the DPR and assumptions regarding:
    - Seasonal correction factors
    - Area of influence of the Assets and its economic perspective
    - Present and future elasticity of transport demand by vehicle type
    - Distribution of traffic into different toll paying categories (normal/concessions as per the Concession Agreement)
    - Traffic growth rates
    - To reconcile traffic and revenue for the latest full year
    - Impact of upcoming developments and future development potential of the region



- Study of impact of competing routes in terms of potential diversion from/to the Asset
- Identification of competing routes and network condition, traffic characteristics and level of tolls charged, if any, on the competing corridors
- Scenario testing for toll revenue
- Identification of red flags related to key traffic assumptions covered under the Base Report
- To assess the potential impact of Bharatmala, Sagarmala, Expressways, innovation in vehicle technology, inland waterways and relaxation in Cabotage rule etc;
- Provide a new traffic forecast based on updated macro assumptions and based on the future potential of the Asset
- Assessment of the future economic outlook based on recent economic performance, the extent of the impact of the COVID-19 pandemic and expected recovery thereafter;
- Develop traffic forecasts based on a revised economic outlook from FY21 onwards;
- Bring the traffic forecast data in the financial model format prepared by the Client; and
- Update the Base Report forecasts based on revisions to the key assumptions and recent traffic information.

## Our approach

- 1.6 The approach employed by Steer in the preparation of these forecasts was developed to take advantage of existing knowledge of the Assets and available data from various sources made available by the Client. It follows well-established practices for forecasting ongoing traffic growth on existing/brownfield Assets.
- 1.7 The analysis focused on two sets of issues, namely:
- understanding the traffic that is currently using the Assets; and
  - identifying how and why that traffic is likely to change in the future.
- 1.8 To identify future changes in traffic, we have assessed the likely future socio-economic and demographic development of the regions served by the Assets that might drive baseline traffic growth, and the impact of any relevant network changes which might cause a diversion of traffic to or from the Asset.
- 1.9 In the forecast we are also considering the increasing penetration of the ETC/FASTag on the Assets. Thus far in FY21, the Assets has already experienced an increasing share of ETC/FASTag users across all vehicle classes, and this share is only set to grow further following the government mandating electronic toll payments in 2021. Given the increasing share of ETC/FASTag based toll payment across the vehicle, we have observed a change in toll payment patterns amongst various toll payment ticket categories which are offered at the toll plazas. Our assessment of increasing ETC/FASTag payment shares in the future will impact the mix of toll payment tickets which will be sold at these plazas, thereby impacting the underlying revenue collection. A detailed assessment of our approach on this aspect is covered in Chapter 3.
- 1.10 Our work is based on traffic data, with different historical sources covering over different time periods till December FY21. ***As per our scope of work, there has been no data collection undertaken by Steer, and Steer has relied on the data provided by the client for the purpose of the study.***
- 1.11 Q4 FY20 saw outbreak of the virus known as COVID-19 throughout the world (labelled as 'pandemic' by the World Health Organisation in March FY20). The Indian government issued a

countrywide 'lockdown' on the 25<sup>th</sup> March 2020, which lasted in this capacity until 8<sup>th</sup> June 2020. The pandemic has resulted in significant disruptions to traffic, with a reduction of both commuting trips to work (as people were required to work from home or stay at home) and leisure trips (due to the closure of various entertainment venues, worship places, etc.).

- 1.12 Given the constantly changing COVID-19 situation, the nature of the global pandemic and its short and long-term recovery is uncertain; therefore, traffic outturn could well differ from those described in this report. This uncertainty should be acknowledged when taking the results of our forecasts and we advise that all readers of the report consider this in the context of their own assessment of the COVID-19 outbreak and its likely impact before making final decisions related to this project.

### **Contents of this Report**

- 1.13 This report has been divided into six chapters (including this Introduction), as follows:
- Chapter 2 describes the key characteristics of the Asset and its surrounding road network.
  - Chapter 3 summarises traffic and revenue - both current and historical on the Asset - including results from the analyses of various data sources provided by the Client.
  - Chapter 4 provides an overview base traffic and revenue estimation and growth analysis.
  - Chapter 5 summarises key forecasting assumptions, results of impacts analysis, and presents our traffic and revenue forecasts for the Asset



- 2.3 As shown in the figure above, the Asset 1 and Asset 2 are located in Gujarat/Rajasthan, and Asset 3 is located in Karnataka. Asset 1 and Asset 2 have one toll plaza each and Asset 3 has two toll plazas.
- 2.4 The table below reports a high-level summary of current levels of traffic and revenue across the Assets, including key characteristics of the Assets relevant for traffic and revenue forecasts. Please note that across the Assets, heavy vehicle categories 3A and MAV contribute to the largest share of revenue, due to their higher toll rates.

**Table 2.1: Description of Assets**

Asset	Asset 1	Asset 2	Asset 3	
State	Gujarat/Rajasthan	Rajasthan	Karnataka/Maharashtra	
Highway	NH27	NH27	NH 48	
Toll plazas	TP1 Khemana	TP1 Undavariya	TP1 Kognoli	TP2 Hattargi
Length (km)	45	31	55	22
AADT (estimated FY21)	13,416	13,555	16,694	17,810
PCU (estimated FY21)	33,318	35,834	29,391	33,144
% 3A+MAV (AADT - FY21)	40.5%	44.5%	15.9%	16.3%
Revenue (INR Cr)	70	49	78	35
% 3A+MAV revenue (FY21)	73.6%	71.5%	40.7%	38.3%

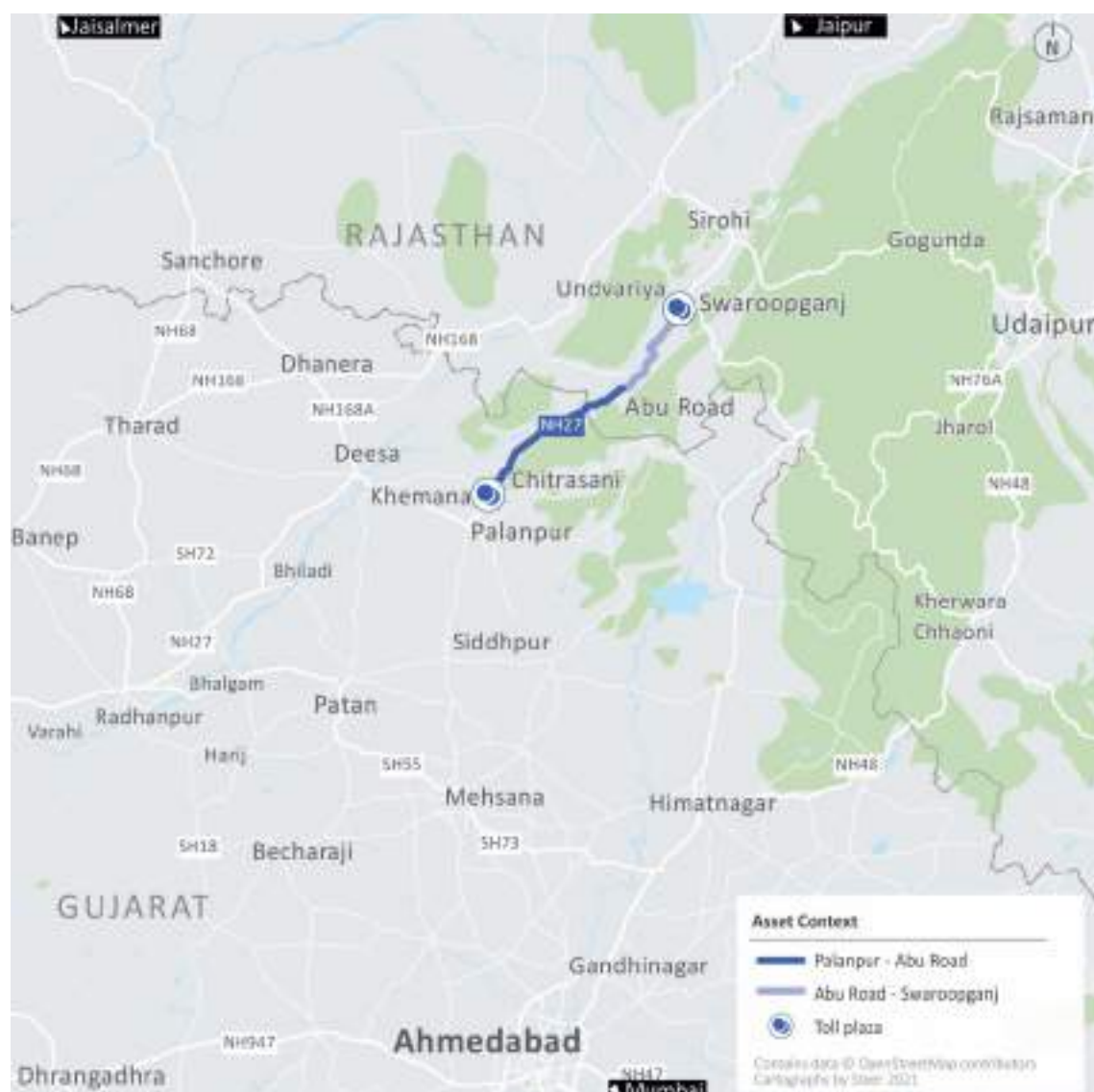
Source: Steer analysis based on various data sources

## Asset 1 (Palanpur-Abu Road) and Asset 2 (Abu Road-Swaroopganj)

### Asset description

- 2.5 Assets 1 and 2 are continuous sections of the same road, as can be seen in Figure 2.2:
- The four-lane Asset 1 starts south of Abu Road on the NH 27 at KM 295+000 with a total Asset length of 45 km ending at KM 340+000. Khemana toll plaza, at Km 339+000, is located just south of Chitrasani village.
  - The four-lane Asset 2 starts near Swaroopganj on the NH 27 at KM 264+000 with a total Asset length of 31 km ending at KM 295+000 near Abu Road. The Asset has one toll plaza at Undavariya at Km 270+250.
- 2.6 These Assets lie on the NH27 which forms one of the key connectors between western Gujarat in the south and Rajasthan and other northern and eastern Indian states. NH27, the second-longest highway in India, caters to the north-west movement between Haryana, Punjab, Delhi, and the different business centres of Gujarat, and east-west movement between Silchar and Porbandar, connecting major centres of economic activity such as Guwahati, Silguri, Lucknow and Udaipur.
- 2.7 CJV movements on these Assets are predominantly local and of a short distance between Palanpur, Swaroopganj, Deesa and other small towns. MAV traffic on the other hand is long-distance in nature, connecting Rajasthan, Punjab, Delhi, and Haryana in the north to industrial cities like Morbi, Jamnagar and Gandhidham, and ports like Kandla and Mundra in Gujarat.

Figure 2.2: Location of Asset and toll plaza



Source: Steer cartography using OpenStreetMap data

2.8 Tolls on both Assets are collected for the categories and rates as shown in the table below.

Table 2.2: FY21 toll rates on Assets 1 and 2 (INR)

Type of vehicle	A1 TP1 Khemana	A2 TP1 Undavariya
CIV or LMV	60	40
LCV, LGV or Minibus	100	65
Bus or Truck (2 axles)	205	130
3 Axle	225	145
HCM or EME or MAV (3 to 6 axles)	325	205
OSV – Oversized vehicles (7 or more axles)	395	250

Source: Toll notifications (FY21, effective from April 2020) shared by the Client



### **Economic activities in the region surrounding the Assets**

- 2.9 Based on our understanding of the region, the key industries are dairy, textile, diamond polishing, and marble processing. Palanpur is a major hub for dairy production, having one of the largest dairies in the State – Banas Dairy. Mehsana is a town located south of Palanpur and is also known for its dairy production and related processing services.
- 2.10 According to the DPR, the key commodities carried by goods vehicles on the Asset include construction material at 20% (including cement, clay, powder), manufacturing products and metals at 16%, agricultural and perishables at 13%, petroleum products at 10% and coal at 6%. As mentioned previously, we believe that marble and stone are also key commodities part of this mix.
- 2.11 The toll plazas also cater to a significant port-bound traffic including Gandhidham industrial cluster (about 30% of MAV traffic by volume) while connecting the regional centres, i.e. Bhilwara, Jodhpur, etc., with the port towns Kandla and Mudra in the Kutch region. There is also a significant amount of traffic carrying powder and other inputs to ceramic-based industry located in the Morbi area in Gujarat.

### **Network context and potential developments**

- 2.12 Being located on the long-distance NH 27, the Assets cater to the following three markets:
- **Short-distance traffic** between local towns and cities (Palanpur, Abu Road) in and around the Asset
  - **Medium-distance traffic** between origins and destinations in western and southern Rajasthan (Udaipur, Kota, Chittorgarh, Bhilwara, Jodhpur) in the north, and regions of Gujarat (including Ahmedabad).
  - **Long-distance traffic** between northern Indian states and industrial regions, ports and cities of Gujarat, Maharashtra, and South India.
- 2.13 The figure below presents the Asset in its long-distance network context. There is no immediate improvement foreseen on the four-lane Asset road. However, road sections on the competing parallel road are currently being upgraded. The analysis of the impacts of these network developments on our traffic and revenue projections are presented in Chapter 5.

Figure 2.3: Asset 1 & 2 and surrounding highway network



Source: Steer cartography using OpenStreetMap data

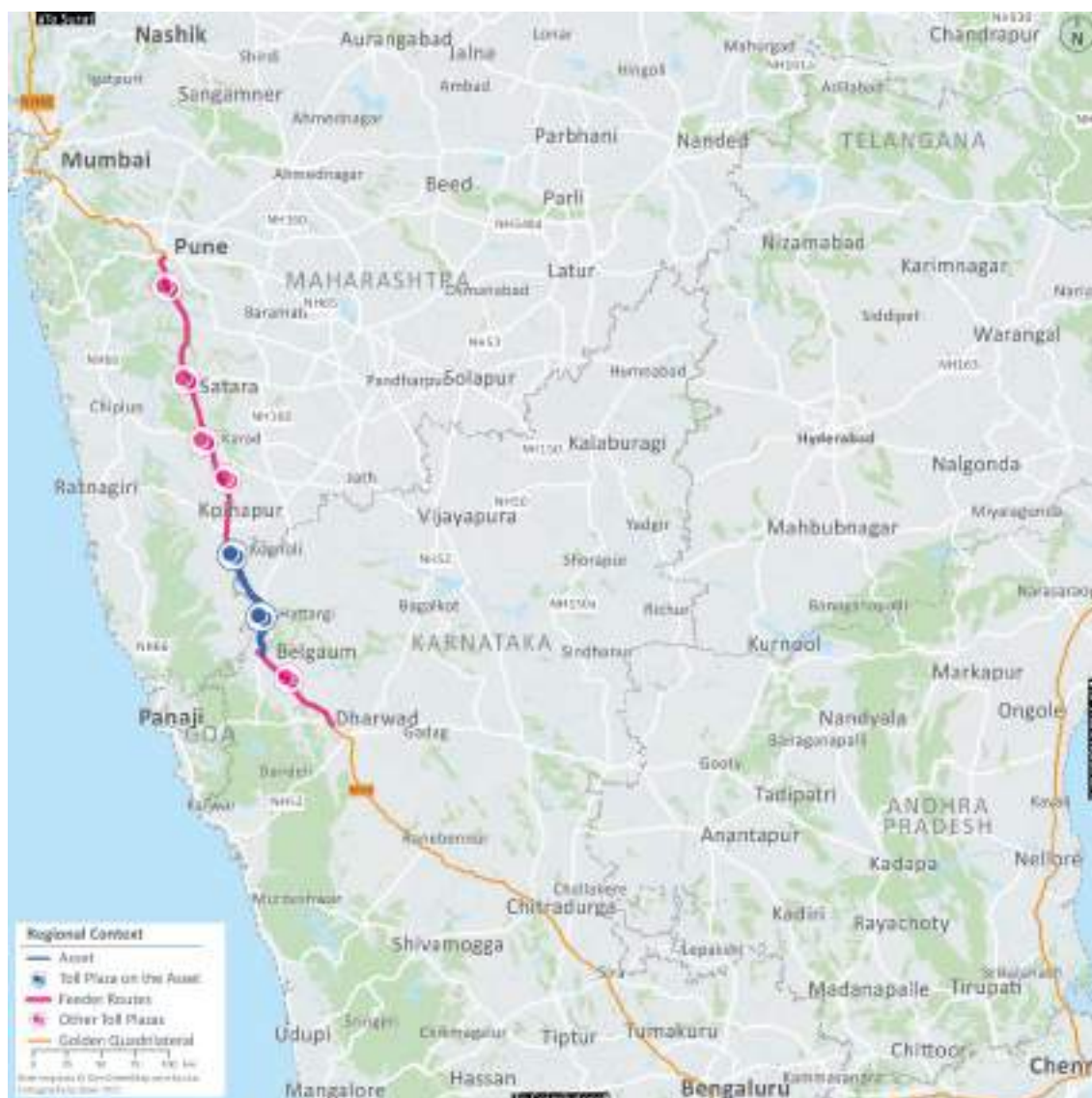
### Asset 3 (Belgaum-Kagal road)

#### Asset description

- 2.14 The four-lane Asset starts just south of Kagal in Karnataka on the NH 48 (at KM 592+240) with a total Asset length of 77km, and ends at Belgaum (KM 515+000). The Asset has two toll plazas at Kognoli (Km 591+240) and Hattargi (KM 537.770), as shown in Figure 2.4. The tolls at the first plaza are associated with 55 km of the Asset, while those at the second plaza are related to the remaining 22 km.
- 2.15 At a more strategic level, the Asset is part of NH 48, which connects Delhi in the north to Chennai in the south covering seven states. Regionally, it also connects the cities of Mumbai in the west to Bangalore/Chennai in the south. The Asset forms a part of the Golden Quadrilateral connecting the four older metropolitan cities in India (Delhi-Mumbai-Chennai-Kolkata). The Asset also serves short distance traffic between the towns and cities of Kolhapur, Belgaum, Hubli, Belur and Dharwad.

2.16 The figure below shows the location of the Assets and its toll plazas.

Figure 2.4: Location of Asset 3 and toll plazas



Source: Steer cartography using OpenStreetMap data

2.17 Tolls on the Asset are collected for the categories and rates as shown in Table 2.3 below.

Table 2.3: FY21 toll rates on Asset 3 (INR)

Type of vehicle	TP1 Kognoli	TP2 Hattargi
CJV or LMV	75	30
LCV, LGV or Minibus	115	45
Bus or Truck (2 axles)	245	95
3 Axle	270	105
HCM or EME or MAV (3 to 6 axles)	385	150
OSV – Oversized vehicles (7 or more axles)	470	185

Source: Toll notifications (FY21, effective from April 2020) shared by the Client

### Economic activities in the region surrounding the Asset

- 2.18 The Asset serves regions that manufacture heavy machine tools, automotive parts, industrial manufacturing products with access to high deposits of bauxite, uranium in close proximity. Besides the manufacturing sector, the Asset also serves a large sugarcane-producing belt and has several sugar mills in its vicinity. Other commercial agricultural goods such as tobacco are also produced in the region.
- 2.19 Belgaum is a major commercial hub for fruits, vegetables, meat, poultry, fish, and wood in Karnataka with numerous sugar industries and a Special Economic Zone. Hindalco Industries Limited is a major aluminium and copper manufacturing company located in Belgaum.
- 2.20 Belur Industrial Area is also situated in the proximity of the Asset, ~70 km from Belgaum, which is home to major industries including Tata motors Ltd, Tata Marcopolo Motors Limited, TATA Hitachi Construction Machinery Co, gas bottling plants for both BPCL and HPCL along with some medium-scale industries related to chemical, pharmaceutical, fertilizers etc. These industries contribute to the traffic on the Asset: MAVs carrying new cars from the KIA motors manufacturing unit in Anantapur, Andhra Pradesh to Maharashtra can also be observed on the road.
- 2.21 There is a Maharashtra Industrial Development Corporation's (MIDC) industrial area near Kagal which includes manufacturing plants, chemical/plastic processing factories, etc.
- 2.22 In addition to the local and regional industries, the Asset also records trucks carrying machinery including spare parts originating from Pune to destinations along the Asset to cities such as Belgaum, Bangalore, Chennai, and other cities. It caters to long-distance movement of automobiles and spare parts from the Sriperumbudur industrial region in Chennai's vicinity.

### 6-Laning of Asset 3 and impact on toll rates

- 2.23 The Asset is expected to undergo 6 laning as part of NHAI programme of 6 laning starting FY23. The DPR for the expansion has been already prepared and several structures are expected to be constructed as part of the 6 laning. Although when an Asset is expanded from 4 lanes to 6 lanes the toll rates don't change only if new structures are not added.
- 2.24 However, there will be new structures added to the Asset which will result in a substantial increase in toll rates starting FY25. In our estimates of impacts detailed below and in chapter 5 we have included the impacted of increased toll rates due to the addition of structures post 6-laning of the Asset. The table below presents the change in tollable lengths:

**Table 2.4: Revised tollable length post 6-Laning of the Asset 3**

Length (km)	Pre-Upgrade		Post-Upgrade	
	Kognoli	Hattargi	Kognoli	Hattargi
Net Tollable length	60.73	23.74	60.73	23.74
Structure based additional Tollable length			15.41	15.95
<b>Total (km)</b>			76.14	39.69

Source: Steer analysis based on client inputs

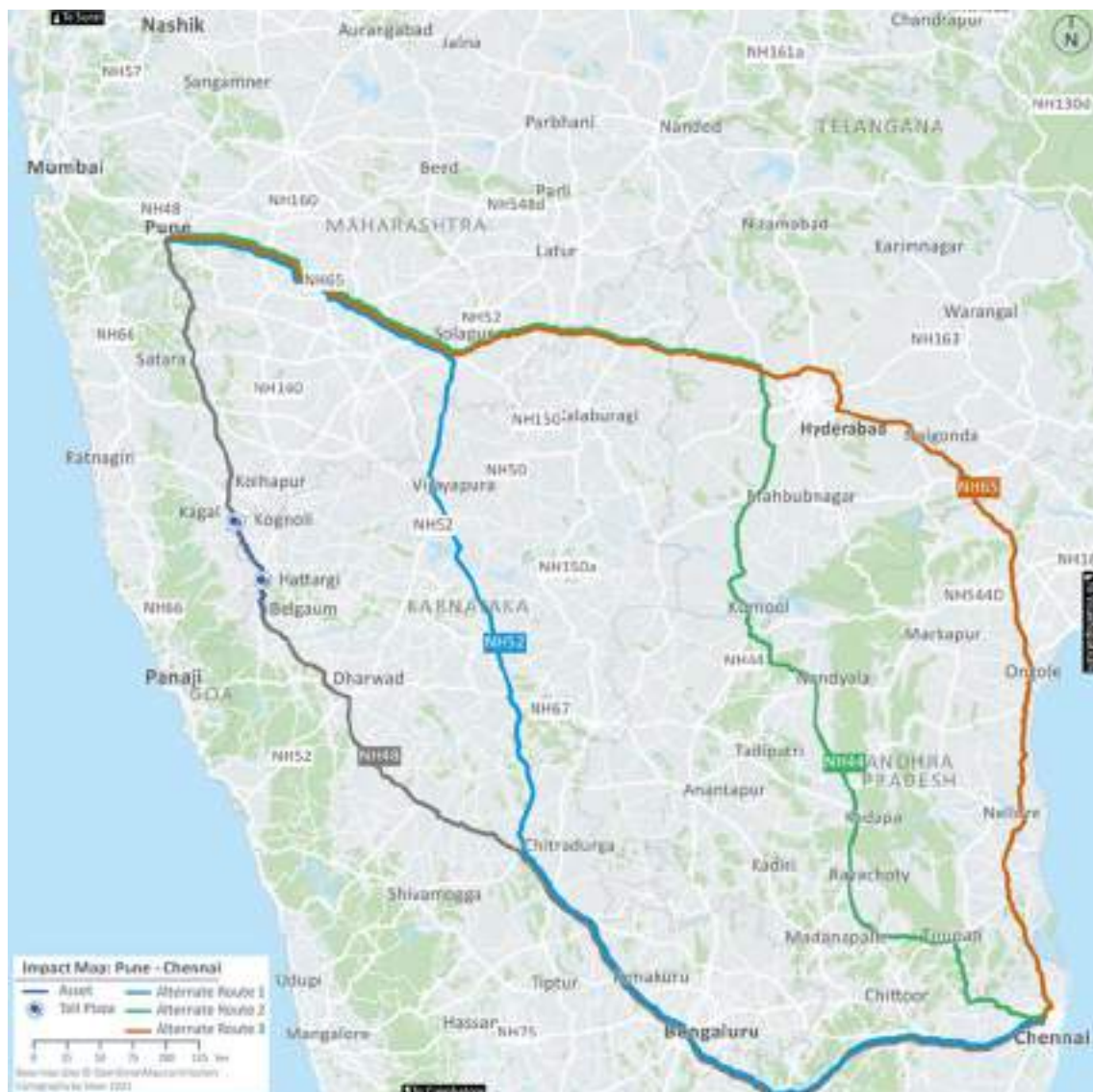
- 2.25 As we can see from the above tables, the change in tollable lengths is substantial for both toll plazas resulting in steep increases in toll rates post construction of these structures.

### Network context and potential developments

- 2.26 The traffic on the Asset can be categorised into two key markets:
- **Short and medium-distance traffic** catering to regional industries and towns lying on and near the Asset (Belgaum, Kagal, Dharwad)
  - **Long-distance traffic** on the strategic NH 48 corridor between Delhi and Chennai via Jaipur, Mumbai, Pune, and Bangalore.
- 2.27 There are no short-distance alternatives for traffic to bypass the Asset's toll plazas. Some of the long-distance alternates to the Asset however include the following, and are shown in the figure below:
- Alternate Route 1: NH52-NH50, between Pune and Bangalore via Solapur, Bijapur and Chitradurg (refer to Alternate Route 1 in the figure below)
  - Alternate Route 2 and 3: NH40-NH16, between Pune and Chennai via Solapur-Hyderabad-Tirupati (refer to Alternate Route 2 in the figure below)/via Solapur-Hyderabad-Ongole (refer to Alternate Route 3 in the figure below)



Figure 2.5: Asset 3 and surrounding highway network



Source: Steer cartography using OpenStreetMap data

- 2.28 On Alternate Route 1 (NH52-NH50 corridor), the following two road sections are being upgraded:
- Solapur - Vijayapura (Bijapur) being upgraded to four-lane by IJM (India) Infrastructure Ltd. as a BOT.
  - Hosapete – Chitradurga is being upgraded by Hampi Expressway Private Limited as a BOT.
- 2.29 On the NH40-NH16 corridor (Alternate Routes 2 and 3), other ongoing developments include the upgrading of the Solapur-Humnapad stretch on the Solapur-Tirupati/Ongole-Chennai route. This section is 144-km-long and is being upgraded to two-lanes with paved shoulders, by Mehul Construction Co. Pvt. Ltd. under HAM.
- 2.30 The analysis of the impacts of these network developments on our traffic and revenue projections are presented in Chapter 5.

## 3 Current and historical traffic and revenue analysis

### Introduction

- 3.1 For traffic and revenue due diligence exercise the data provided by the toll plaza is typically the primary source of establishing a road asset's base position, in terms of vehicle level AADT and PCU levels, as well as historical performance, in terms of growth trends by vehicle type. However due to the unique nature of the assets under consideration in this assignment, being operated under different Operate Manage and Transfer (OMT) contracts, basically independent contractors, it was important to validate the toll plaza data against other independent data sources.
- 3.2 An independent traffic count is often a good way to validate the toll plaza information. Even though there were traffic counts conducted as part of the Base Report/DPR that have been provided, there was no correlation established between the toll plaza data and the independent traffic counts that was covered in the DPR. Similarly the historical trend analysis and forecasting approach presented in the DPR was not considered to be appropriate given the lack of confidence in the toll plaza data used, and the lack of detailing in the forecasting process or its correlation to various relevant growth drivers.
- 3.3 Therefore, it was important to carry out an independent verification of the toll plaza data and the traffic count data using alternate data sources to establish the traffic and revenue base position.
- 3.4 A fresh set forecasting approach was also developed using this independent data and benchmarks available from other studies. These data sources, described in detail below, were made available by the client team and proved to be very helpful in establishing the base position as well as the historical trends that could be relied upon for developing a robust set of forecasts.
- 3.5 This section below presents the current and historical traffic and revenue position of the Assets. For this study, traffic data is made available from different sources shared by the Client, namely:
- IHMCL counts;
  - Schedule-M;
  - Traffic section of Base Report/DPR;
  - Independent Engineers' (IE) reports; and
  - Traffic data from surrounding Assets.

#### *IHMCL data*

- 3.6 IHMCL or Indian Highways Management Company Limited undertakes 7-day traffic volume counts on NHAI toll plazas. The counts are classified by vehicle type and presents a reasonable

position of the traffic that appears on the Asset for that time period. These counts are undertaken by IHMCL at different times of the year and over multiple years. These counts can be analysed to represent a traffic profile of different vehicle types over the years and their evolution.

- 3.7 For this study, IHMCL counts were made available for the Assets for different time periods and are discussed individually for each Asset in the sections below.

*Schedule M data*

- 3.8 NHAI mandates all toll operators to submit a monthly traffic and revenue report segregated by vehicle type and ticket category. The report has separate sections for traffic volumes and the resulting revenue generated from those transactions. This data can be analysed to evaluate

- Historical monthly traffic profile evolution over the years
- Ticket type segmentation to arrive at the revenue generated from transactions
- Reported revenue on a month on month basis

- 3.9 For this study Schedule-M data was available for all toll plazas for different time periods. It is essential to note that particularly the toll plaza operated under quarterly, 6-month or annual contracts, the reporting of traffic and revenue under Schedule-M greatly depends on the quality of systems used by the operator. Since these operators typically work on short-term contracts, historical analysis of Schedule M data does not show consistent trends. Therefore, a historical trend analysis, over several years, of such data often shows inconsistent results.

- 3.10 In order to confirm our thinking on the validity of Schedule-M, we have done a check on the volume counts available from different sources (IHMCL, DPR, IE report) and compared it for the same period with the Schedule M data. Such comparisons for all the Assets have shown data gaps with larger gaps appearing on Asset 1 and Asset 2, and a good fit on Asset 3. These comparisons were made on a more recent November 2020 data set, however the historical data reported under Schedule-M continues to show inconsistent results. These are discussed in more detail in the next sections.

*Traffic section/report from Detailed Project Report (DPR)*

- 3.11 NHAI deputed other consultants to prepare a DPR for each of the Assets. We were provided the traffic section/report of the DPR which included information such as:

- 7-day Traffic volume counts undertaken on each of the plazas
- OD survey undertaken at each of the Plaza
- Elasticity, Segmentation, and seasonality assumptions for forecasting purposes

- 3.12 We have undertaken a detailed review of the assumptions undertaken in these traffic reports and incorporated the same in the forecasts wherever found reasonable.

*Independent Engineer (IE) Report*

- 3.13 The Independent Engineer report was available for Asset 3. The report provided the 7-day TVC count for both the toll plazas for March 20 and November 2020. We have used this data point to estimate and validate our base traffic position.

*Traffic data from surrounding Assets*

- 3.14 Each of the Asset is surrounded by Assets which are currently been operated by private concessionaries such as L&T (for Asset 1 and 2) and Askoka Buildcon (Asset 3). The toll plazas

by these concessionaires are being managed professionally and the systems used by these concessionaires for recording traffic profile are robust. Therefore, the historical traffic profile reported on these Assets is considered much more believable.

- 3.15 As discussed, For Assets 1 and 2, monthly reported traffic was provided by the Client for the connecting route Beawar-Pali-Pindwara (BPP) and for Asset 3, information is provided for the route Belgaum-Dharwad (BD) which is located just south of the Asset 3.
- 3.16 As discussed in chapter 2, BPP corridor acts as a feeder onto the Assets 1 and 2, and the long-distance traffic carries the same travel patterns, especially for goods vehicles, as on the Assets 1 and 2. Similarly, BD corridor lies south of the Asset 3, wherein the majority of the long distance goods traffic between Pune and Bangalore passes both the Assets (Asset 3 and BD), therefore the traffic patterns and profile of the traffic on BD is very similar on Asset 3.
- 3.17 Therefore, we have used the traffic data from these surrounding assets as a benchmark for estimating the various base-year and forecasting assumptions presented in Chapters 5.
- 3.18 The below table summarises the sources and the time periods for which the information is available for all the toll plazas:

**Table 3.1: Summary of the data available**

	IHMCL data	Schedule M	DPR (7 Day classified counts), OD data	IE reports (7 Day classified counts)	Traffic data from surrounding Assets
TP1 Khemana	Dec-15 to Feb-19 *	Jun-19 to Nov-20	Feb-18 and Nov-20, 1 Day OD data	-	Apr-19 to Jan-21
TP1 Undavariya	Jul-15 to Nov-20 *	Apr-19 to Dec-20	Feb-18 and Nov-20, 1 Day OD data	-	Apr-19 to Jan-21
TP1 Kognoli	Jul-15 to Nov-20 *	Jan-18 to Nov-20	Oct-20, 1 Day OD data	Mar-20 and Nov-20	Apr-12 to Jan-21
TP2 Hattargi	Jul-15 to Nov-20 *	Jan-18 to Nov-20	Nov-20, 1 Day OD data	Mar-20 and Nov-20	Apr-12 to Jan-21

Source: Steer analysis of data provided by Client, \*Information is available only for few months in the mentioned time range.

## Historical traffic and revenue analysis from various sources

### Asset 1 Palanpur-Abu Road and Asset 2 Abu Road-Swaroopganj

#### *IHMCL data*

- 3.19 IHMCL counts are available on Asset 1 Khemana toll plaza from Dec-15 (FY16) and Feb-19 (FY19). The point-in-time CAGRs between Jun-16 and Feb-19 shows a PCU growth of 11%, representing positive historical growth of the traffic on the Asset. These CAGR however, do not signify the actual growth the Asset has witnessed as the counts are not adjusted for seasonality however, they do provide a relevant basis for evaluating the historical trajectory of the traffic profile using the Asset.

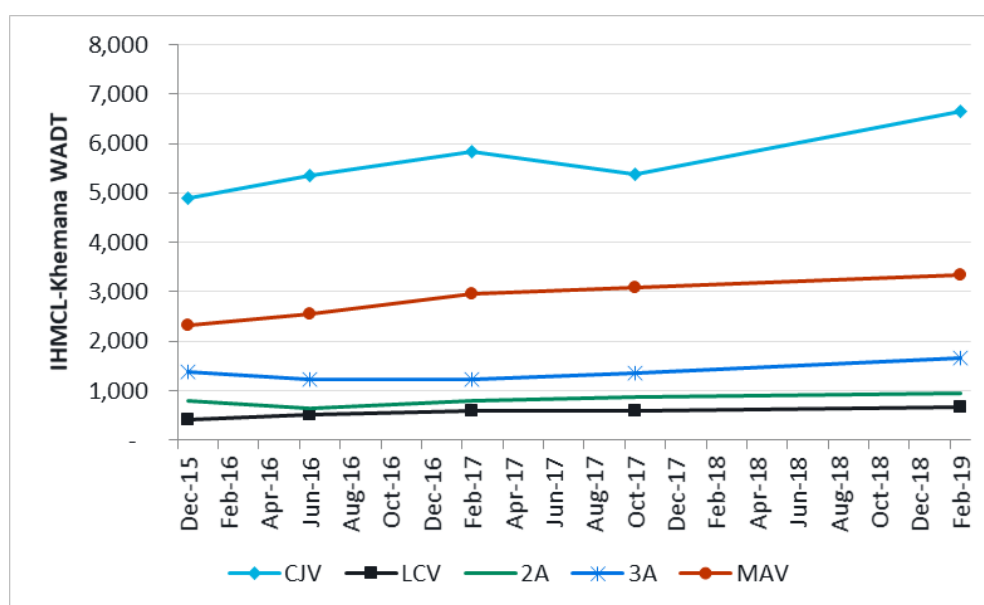
**Table 3.2: Historical counts (IHMCL) on A1 Khemana toll plaza and CAGR**

	Dec-15	Jun-16	Feb-17	Oct-17	Aug-18	Feb-19	CAGR (Feb-19 vs Jun-16)
CJV	4,905	5,349	5,831	5,366	3,996	6,648	8.9%
LCV	424	512	606	589	377	668	10.5%
2A/Buses	786	647	805	883	515	960	15.9%
3A	1,390	1,219	1,239	1,358	1,670	1,668	5.9%
MAV	2,328	2,551	2,971	3,082	4,817	3,333	12.5%
<b>Total</b>	<b>9,834</b>	<b>10,279</b>	<b>11,453</b>	<b>11,279</b>	<b>11,375</b>	<b>13,279</b>	<b>10.1%</b>
<b>PCU</b>	<b>22,550</b>	<b>23,199</b>	<b>26,246</b>	<b>26,846</b>	<b>32,793</b>	<b>30,542</b>	<b>10.8%</b>

Source: Steer analysis of data provided by Client

- 3.20 The figure below represents provides a graphical representation of the table above. The key categories of CJV and MAV - the key contributors to revenue - have shown an upward trend in historical performance. The data from these point-in-time IHMCL counts signifies a growing trend of traffic on Asset 1.

**Figure 3.1: Historical traffic counts - WADT\***



Source: Steer analysis; \*markers indicate the months for which the information is available

- 3.21 IHMCL counts are available on A2 Undavariya toll plaza starting Jul-15 (FY16) ending Nov-19 (FY20). Similar to Asset 1, the point-in-time CAGRs between Jun-16 and Nov-20 shows a PCU growth of 11%, representing a positive historical growth of the traffic on the Asset<sup>1</sup>.

<sup>1</sup> These CAGR however, do not signify the actual growth the Asset has witnessed as the counts are not adjusted for seasonality however, they do provide a relevant basis for evaluating the historical trajectory of the traffic profile using the Asset



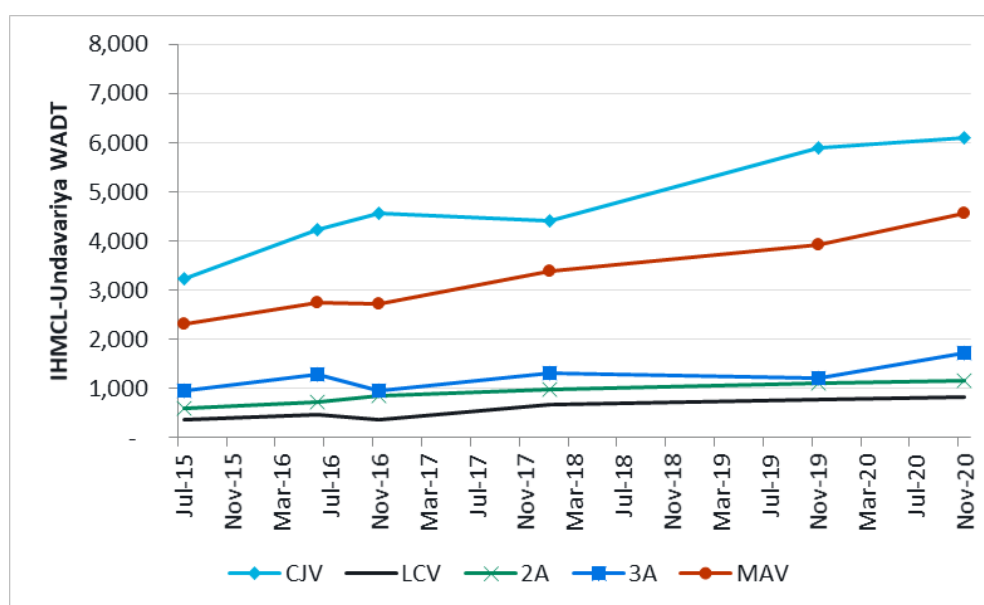
**Table 3.3: Historical counts (IHMCL) on A2 Undavariya toll plaza and CAGR**

Vehicle type	Jul-15	Jun-16	Nov-16	Jan-18	Nov-19	Nov-20	CAGR (Nov-20 vs Jun-16)
CJV	3,219	4,232	4,559	4,414	5,893	6,108	8.4%
LCV	362	466	371	665	758	819	13.6%
2A/Buses	597	711	852	968	1,110	1,151	11.5%
3A	958	1,282	956	1,307	1,206	1,720	6.9%
MAV	2,318	2,744	2,708	3,390	3,919	4,551	12.1%
<b>Total</b>	<b>7,455</b>	<b>9,436</b>	<b>9,446</b>	<b>10,746</b>	<b>12,893</b>	<b>14,363</b>	<b>10.0%</b>
<b>PCU</b>	<b>18,863</b>	<b>23,263</b>	<b>22,726</b>	<b>27,501</b>	<b>31,645</b>	<b>36,492</b>	<b>10.7%</b>

Source: Client data

- 3.22 The figure below represents provides a graphical representation of the table above. The key categories of CJV and MAV - the key contributors to revenue - have shown an upward trend in historical performance. The data from these point-in-time IHMCL counts signifies a growing trend of traffic on Asset 2 as well.

**Figure 3.2: Historical traffic counts - WADT\***



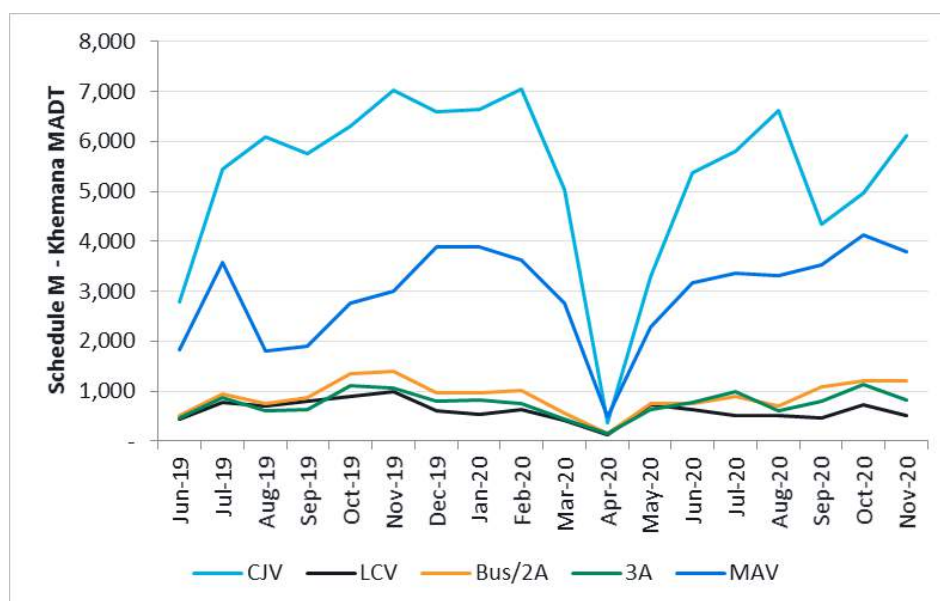
Source: Steer analysis; \*markers indicate the months for which the information is available

#### *Schedule M Toll Plaza data*

- 3.23 As discussed above the Schedule M data for available on a monthly level starting June 2019 upto Nov 2020 for the Asset 1 Khemana toll plaza and April'19 upto Dec 20 for Asset 2

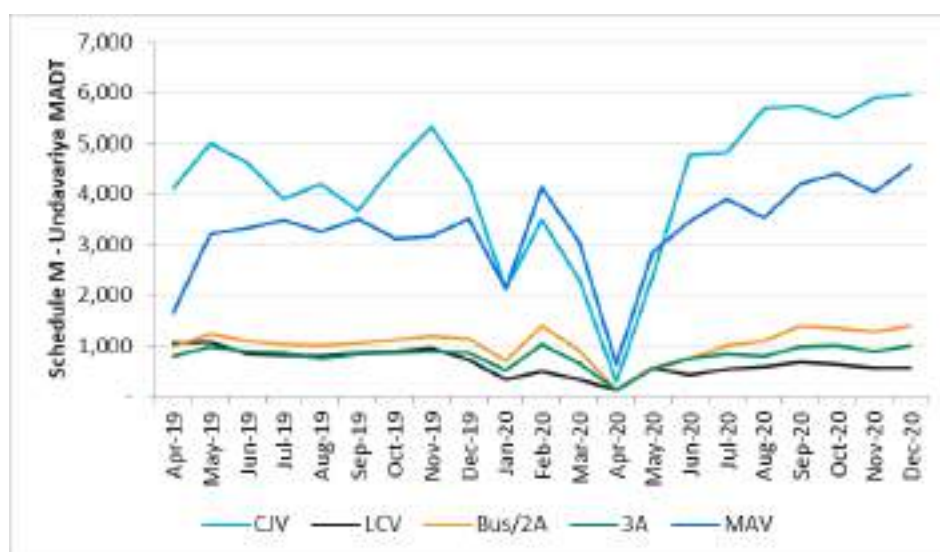
Undavariya toll plaza. The data is presented in the figure below. The dip in monthly traffic in months of March, April and May is due to the nationwide lockdowns due to COVID-19.<sup>2</sup>

**Figure 3.3: Historical MADT (Schedule-M) on Asset 1 Khemana**



Source: Steer analysis of Schedule M data

**Figure 3.4: Historical MADT (Schedule-M) on Asset 2 Undavariya**



Source: Steer analysis

3.24 The table below presents the Schedule M traffic for Nov-19 and Nov-20, time periods for which IHMCL data is available (only for Undavariya plaza), for comparison purposes:

<sup>2</sup> Q4 FY20 saw outbreak of the virus known as COVID-19 throughout the world (labelled as 'pandemic' by the World Health Organisation in March FY20). The Indian government issued a countrywide 'lockdown' on the 25<sup>th</sup> March 2020, which latest in this capacity until 8<sup>th</sup> June 2020. The pandemic has resulted in significant disruptions to traffic, with a reduction of both commuting trips to work (as people were required to work from home or stay at home) and leisure trips (due to the closure of various entertainment venues, worship places, etc.).

**Table 3.4: Schedule-M data points for Asset 1 and 2**

	Asset 1 Khemana		Asset 2 Undavariya	
Vehicle Type	Nov-19	Nov-20	Nov-19	Nov-20
CJV	7,026	6,121	5,329	5,904
LCV	981	513	942	569
Bus/2A	1,389	1,194	1,186	1,278
3A	1,050	811	892	887
MAV	3,006	3,797	3,151	4,043
OSV	68	7	16	7
<b>Total</b>	<b>13,520</b>	<b>12,443</b>	<b>11,516</b>	<b>12,688</b>
<b>PCU</b>	<b>29,647</b>	<b>30,024</b>	<b>27,229</b>	<b>31,479</b>

- 3.25 As we can see from the above table, in Nov 19 IHMCL reported 31,645 PCUs vs 27,229 Schedule M, and in Nov-20 IHMCL reported 36,492 PCU vs 31,479 PCU as per schedule M. This further confirms the under reporting of data in Schedule M.

*DPR counts*

- 3.26 The tables below present the traffic counts from the DPR for toll plazas on Assets 1 and 2.

**Table 3.5: Historical counts (DPR) on Asset 1 Khemana toll plaza**

	Feb-18	Nov-20
CJV	6,445	7,691
LCV	685	423
Buses	258	420
2A	569	776
3A	1,455	1,125
MAV	3,418	4,659
<b>Total</b>	<b>12,830</b>	<b>15,094</b>
<b>PCU</b>	<b>29,700</b>	<b>36,254</b>

Source: Client data

**Table 3.6: Historical counts (DPR) on Asset 2 Undavariya toll plaza**

	Feb-18	Nov-20
CJV	4,817	6,938
LCV	347	539
Buses	501	568
2A	524	719
3A	1,109	1,062
MAV	3,473	5,354
<b>Total</b>	<b>10,771</b>	<b>15,180</b>
<b>PCU</b>	<b>27,368</b>	<b>38,887</b>

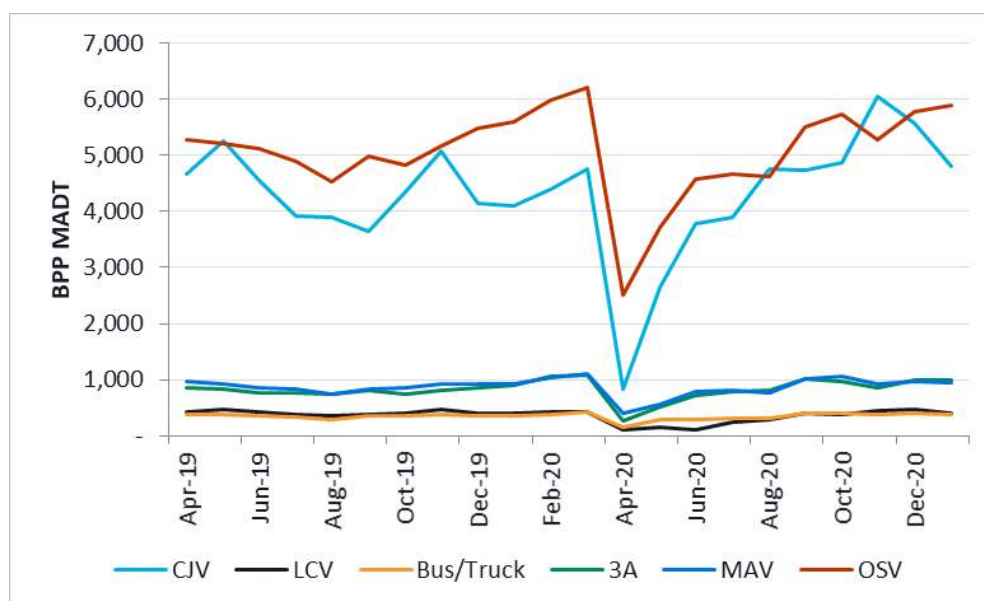
Source: Client data

- 3.27 As we can see from the above analysis, the PCU levels for Asset 2 Undavariya from three different sources is around 38,000 PCU's<sup>3</sup>, and around 36,000 PCU for Asset 1 Khemana plaza.

#### Monthly reported traffic on the surrounding Assets/connecting roads

- 3.28 The reported traffic volume on a connecting road, Beawar-Pali-Pindwara (BPP), was shared with us for the duration of Apr-19 to Jan-21, as presented in the figure below. BPP acts as a major feeder to Asset 1 and 2, with similar destinations for long-distance traffic such as the ports, Morbi, Jamanagar, in addition to Ahmedabad and other major towns in Gujarat. Hence it is reasonable to believe that the traffic profile on this Asset will mirror the profile on Asset 1 and 2.
- 3.29 The monthly profile of historical traffic is presented in the chart below:

**Figure 3.5: Historical monthly traffic profile on BPP Toll Plaza 4**



Source: Steer analysis

- 3.30 As we can see from the table below, the point in time CAGR for the overall PCUs, without applying seasonality, is recorded at 5%. The PCU levels in November 2020 is around to 37,000, which is close to the observed PCU levels on Undavariya and Khemana plazas.
- 3.31 Further, it is also important to note the recovery in traffic especially in MAV and CJV traffic to pre COVID19 levels. As we can see in the graph above the recovery started as early as June 2020 on these Assets, as they feed into key industrial regions of the country.

**Table 3.7: Historical traffic performance of BPP toll plaza 4**

	Nov-20	CAGR (Apr-19 to Jan-21)
CJV	6,054	1.8%
LCV	377	(2.1%)
Buses	438	(2.0%)

<sup>3</sup> The volume counts were undertaken at different time of the month so a small variation is expected depending on the week the surveys were carried out.

	Nov-20	CAGR (Apr-19 to Jan-21)
2A	855	9.6%
3A	911	(2.2%)
MAV	5,281	6.4%
<b>Total</b>	<b>13,916</b>	<b>3.8%</b>
<b>PCU</b>	<b>36,998</b>	<b>5.0%</b>

Source: Client data

- 3.32 Based on the various data sets above it can be inferred that the PCU level on toll plazas in the region is around 37,000 PCU. The data from BPP shows a consistent historical trend and is a better reflection of the actual traffic growth in the corridor.
- 3.33 Data for the Asset, and the surrounding corridor indicates that the largest impact on traffic was experienced between the months of March 2020 and May 2020, with recent months showing volumes returning to and surpassing FY20 levels. This is in part due to ongoing recovery of traffic and a release of pent up demand in certain vehicle categories, as well as, potential short-term shift to cars due to perceptions of safety/reduction of public transport services. In our analysis around the short-term fallout of this pandemic, we have included assumptions around the above, as well as, longer-term impacts of the pandemic.

### Asset 3 Belgaum-Kagal

#### IHMCL Data

- 3.34 IHMCL counts are available on Asset 3 Kognoli toll plaza starting Jul-15 (FY16) ending Nov-20 (FY21). As shown in the table below, the point-in-time CAGRs between these months shows a PCU growth of 2.6%. These CAGR's however, do not signify the actual growth the Asset has witnessed as the counts are not adjusted for seasonality however, they do provide a relevant basis for evaluating the historical trajectory of the traffic profile using the Asset.

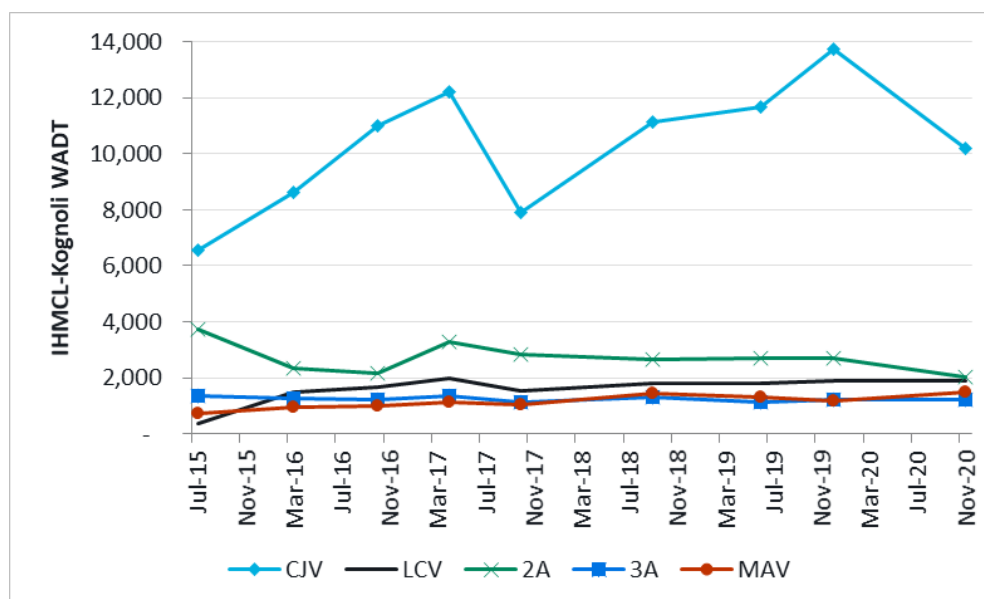
**Table 3.8: Historical IHMCL counts on TP1 Kognoli toll plaza**

	Mar-16	Oct-16	Apr-17	Oct-17	Sep-18	Jun-19	Dec-19	Nov-20	CAGR (Mar-16 to Nov-20)
CJV	8,637	10,984	12,207	7,911	11,150	11,664	13,736	10,203	3.5%
LCV	1,509	1,655	2,000	1,551	1,801	1,795	1,888	1,888	4.9%
2A/bus	2,351	2,159	3,265	2,852	2,655	2,709	2,698	2,022	(3.2%)
3A	1,264	1,230	1,365	1,127	1,303	1,124	1,230	1,207	(1.0%)
MAV	969	1,007	1,142	1,032	1,431	1,321	1,183	1,503	9.8%
<b>Total</b>	<b>14,733</b>	<b>17,036</b>	<b>19,981</b>	<b>14,477</b>	<b>18,342</b>	<b>18,614</b>	<b>20,736</b>	<b>16,827</b>	<b>2.9%</b>
<b>PCU</b>	<b>26,120</b>	<b>28,170</b>	<b>34,245</b>	<b>26,837</b>	<b>32,174</b>	<b>31,805</b>	<b>33,680</b>	<b>29,504</b>	<b>2.6%</b>

Source: Client data



Figure 3.6: Historical traffic counts - WADT\*



Source: Steer analysis; \*markers indicate the months for which the information is available

3.35 Similarly, IHMCL counts are available on Hattargi toll plaza starting Jul-15 (FY16) ending Nov-20 (FY21). The figure and table below illustrate the growth of traffic over this period.

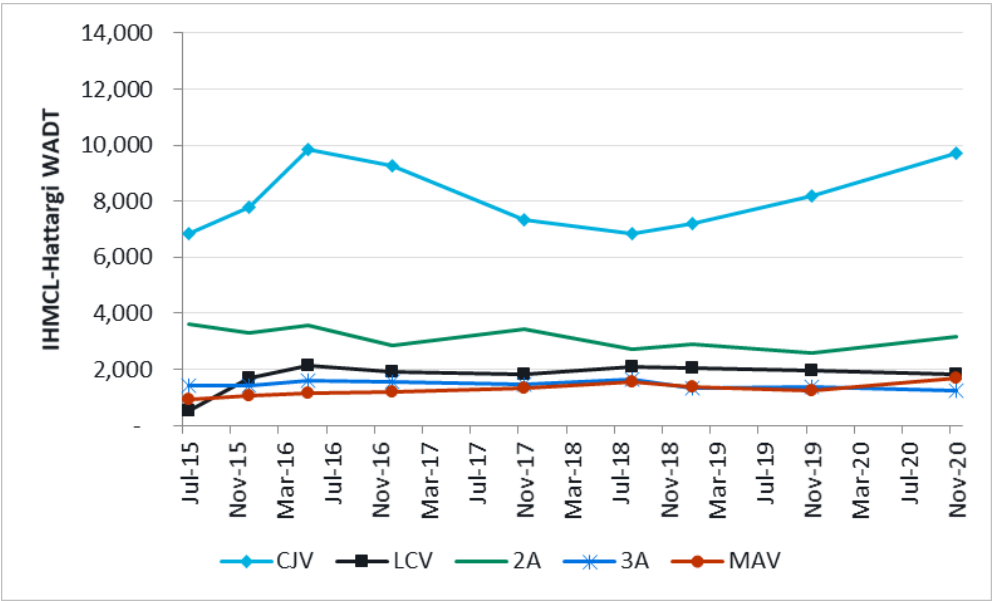
3.36 As shown in the table below, the point-in-time CAGRs between these months shows a PCU growth of 1.8%.

Table 3.9: Historical IHMCL counts on Hattargi toll plaza

	May-16	Dec-16	Nov-17	Aug-18	Jan-19	Nov-19	Nov-20	CAGR (May-16 to Nov- 20)
CJV	9,839	9,273	7,333	6,821	7,203	8,183	9,705	2.2%
LCV	2,120	1,933	1,826	2,083	2,061	1,975	1,807	(1.5%)
2A	3,579	2,839	3,442	2,738	2,883	2,590	3,163	2.5%
3A	1,578	1,565	1,447	1,632	1,313	1,376	1,242	(5.2%)
MAV	1,169	1,183	1,323	1,546	1,377	1,250	1,677	8.4%
<b>Total</b>	<b>18,288</b>	<b>16,795</b>	<b>15,376</b>	<b>14,823</b>	<b>14,839</b>	<b>15,376</b>	<b>17,598</b>	<b>1.1%</b>
<b>PCU</b>	<b>33,764</b>	<b>30,717</b>	<b>30,715</b>	<b>30,026</b>	<b>29,088</b>	<b>28,678</b>	<b>33,195</b>	<b>1.8%</b>

Source: Client data

Figure 3.7: Historical traffic counts - WADT\*

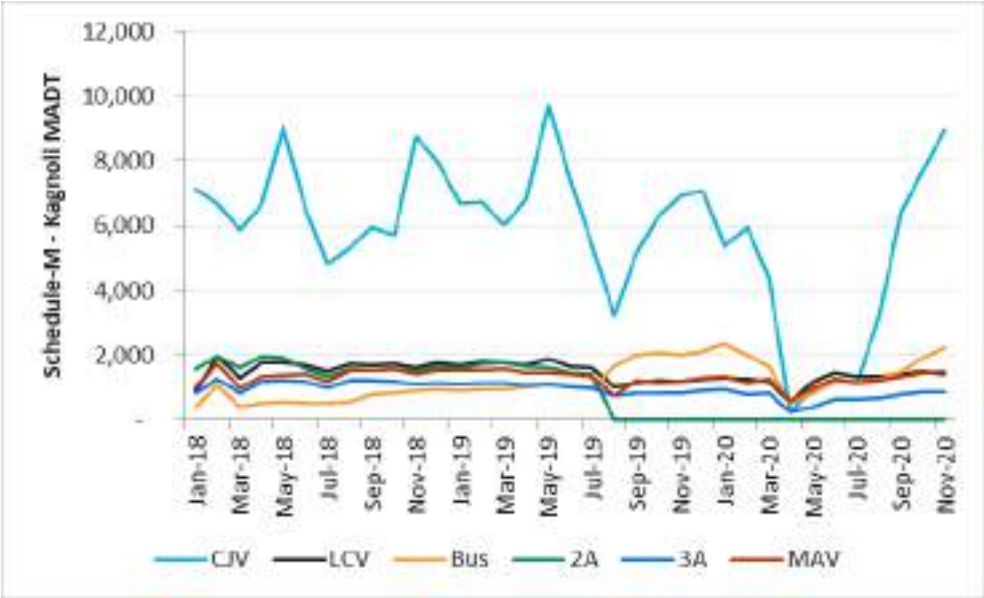


Source: Steer analysis; \*markers indicate the months for which the information is available

Schedule M Toll Plaza data

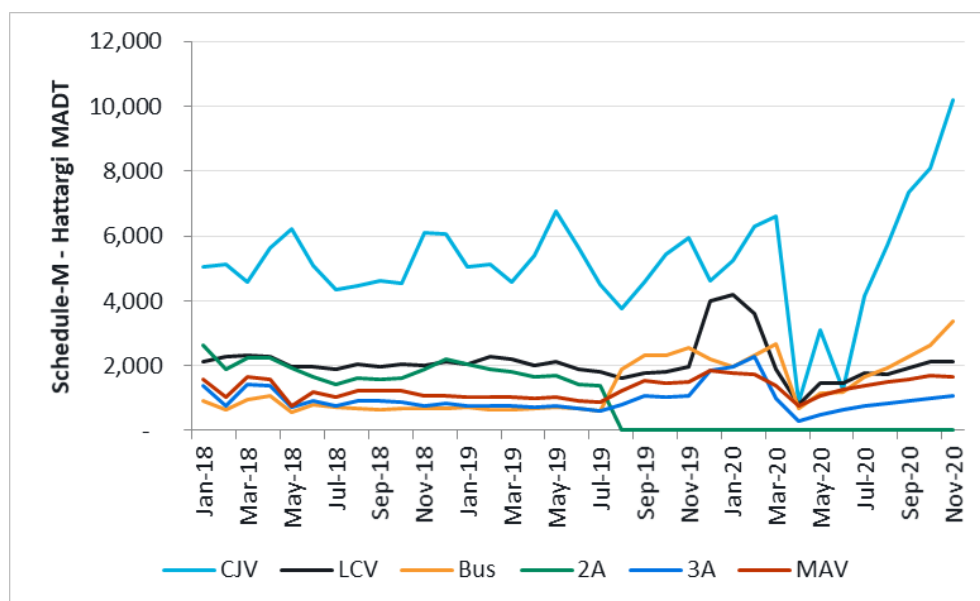
3.37 The figures below present the reported traffic volume from Schedule M for TP1 Kognoli and TP2 Hattargi on Asset 3, in terms of monthly average daily traffic (MADT) from Jan-18 (FY18) to Nov-20 (FY21).

Figure 3.8: Historical MADT (Schedule-M) on Asset 3 Kognoli



Source: Steer analysis. \* The drop in 2A and rise of bus traffic in Aug-19 is due to 2A and bus data being aggregated: both 2A and bus are shown under Bus category from Aug-19 onwards

Figure 3.9: Historical MADT (Schedule-M) on Asset 3 TP2 Hattargi



Source: Steer analysis

- 3.38 The table below presents the Schedule M traffic for Nov-19 and Nov-20, time periods for which IHMCL data is available for Hattargi plaza, and Dec-19 and Nov-20 for Kognoli plaza, for comparison purposes:

Table 3.10: Schedule M data points for Asset 3

Vehicle Type	Kognoli		Hattargi	
	Dec-19	Nov-20	Nov-19	Nov-20
CJV	7,062	8,950	5,951	10,206
LCV	1,286	1,425	1,967	2,124
Bus	2,140	2,239	2,539	3,378
2A		-	-	-
3A	925	887	1,059	1,049
MAV	1,290	1,492	1,481	1,647
OSV	2	2	9	7
<b>Total</b>	<b>12,705</b>	<b>14,995</b>	<b>13,007</b>	<b>18,410</b>
<b>PCU</b>	<b>25,389</b>	<b>28,517</b>	<b>27,991</b>	<b>35,686</b>

Source: Steer analysis of Client Schedule M data

- 3.39 As we can see from the data points above, for Kognoli plaza for Nov-20 the reported levels are 29,500 as per IHMCL versus 28,500 as per Schedule M, whereas for Hattargi toll plaza PCU levels correspond to 33,195 and 35,600 levels. (with major differences in CJV and LCV levels). These comparisons are much closer than the comparisons for Asset 1 and Asset 2. Therefore we believe the Schedule-M data for Asset 3 is reasonably reliable.

### Independent Engineers' (IE) report: MSV report

- 3.40 Traffic counts from the IE reports for both the toll plazas on Asset 3 is presented in the table below. Out of this, Nov-20 counts are used for the estimation of AADT, discussed in further detail in the Chapter 5.

**Table 3.11: Historical counts (IE report) on Asset 3**

Asset	A3 TP1 Kognoli		A3 TP2 Hattargi	
	Mar-20	Nov-20	Mar-20	Nov-20
CJV	6,342	11,047	6,782	10,671
LCV	1,558	1,950	1,901	2,147
Bus	637	755	689	832
2A	1,004	1,129	1,220	1,989
3A	964	999	1,120	1,183
MAV	1,375	1,583	1,542	1,643
<b>Total</b>	<b>11,882</b>	<b>17,464</b>	<b>13,259</b>	<b>18,467</b>
<b>PCU</b>	<b>22,691</b>	<b>29,749</b>	<b>25,682</b>	<b>33,306</b>

Source: Client data

### DPR counts

- 3.41 The table below present Nov-20 traffic counts from DPR for the toll plazas on Asset 3.

**Table 3.12: Historical counts (DPR) for Nov-20 on Asset 3**

Asset	TP1 Kognoli	TP2 Hattargi
CJV	8,361	8,712
LCV	1,915	2,061
Buses	503	723
2A	942	1,266
3A	973	1,025
MAV	1,628	1,663
<b>Total</b>	<b>14,326</b>	<b>15,454</b>
<b>PCU</b>	<b>25,832</b>	<b>28,347</b>

Source: Client data

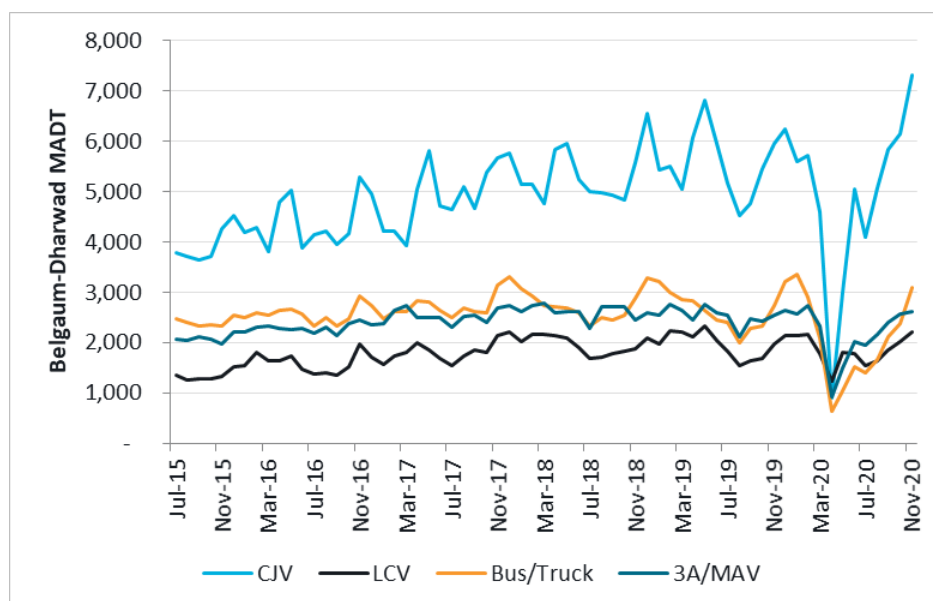
- 3.42 The above counts were carried in the month of November 20, however, as compared to IHMCL , IE report, the overall traffic and PCU levels are lower than counted by all three other data points therefore, we have not considered DPR counts in our analysis.

### Monthly reported traffic on the surrounding Assets/connecting roads

- 3.43 For Asset 3, the reported traffic volume on a connecting road, Belgaum-Dharwad (Hirebagewadi toll plaza) was shared with us for the duration of Apr-12 to Jan-21. This Asset lies south of Asset 3 and is part of the national Golden Quadrilateral corridor connecting Mumbai-Pune to Bangalore and Chennai. The traffic profile of heavy vehicles which are

predominantly long distance is very similar on both the Assets, hence we believe that the data on the Belgaum – Dharwad Asset is a reasonable reflection of the traffic profile on Asset 3. for comparison purposes the traffic profile between July-15 and December-20 is presented below.

**Figure 3.10: Historical traffic on Belgaum-Dharwad**



Source: Client data

- 3.44 As we can see from the table below, the point in time CAGR for the overall PCUs, without applying seasonality, is recorded at 5%. The PCU levels in November 2020 is around to 31,000, which is close to the observed PCU levels on Asset 3 toll plazas.

**Table 3.13: Historical counts on toll plaza and CAGR**

	Nov-20	CAGR (Jul-15 to Nov-20)
CJV	7,312	12.4%
LCV	2,209	9.1%
Buses	795	
2A	2,307	3.8%*
3A	577	
MAV	2034	3.7%*
<b>Total</b>	<b>15,233</b>	<b>8.2%</b>
<b>PCU</b>	<b>30,812</b>	<b>6.2%</b>

Source: Client data, \* Bus/2A and 3A/MAV category combined

- 3.45 Based on the various data sets above it can be inferred that the PCU level on toll plazas in the region is around 30,000 PCU. The data from BD shows a consistent historical trend and is a better reflection of the actual traffic growth in the corridor.
- 3.46 Data for the Asset, and the surrounding corridor indicates that the largest impact on traffic was experienced between the months of March 2020 and May 2020, with recent months showing volumes returning to and surpassing 2019 levels. This is in part due to ongoing recovery of traffic and a release of pent up demand in certain vehicle categories, as well as,



potential short-term shift to cars due to perceptions of safety/reduction of public transport services. In our analysis around the short-term fallout of this pandemic, we have included assumptions around the above, as well as, longer-term impacts of the pandemic.

### Electronic Toll Collection

- 3.47 Government of India has introduced (and more recently, mandated) Electronic Toll Collection (ETC) across National Highways in India, collected via “FASTag”. The timeline of ETC implementation is presented in the following table.

**Table 3.14: Timeline of national ETC implementation**

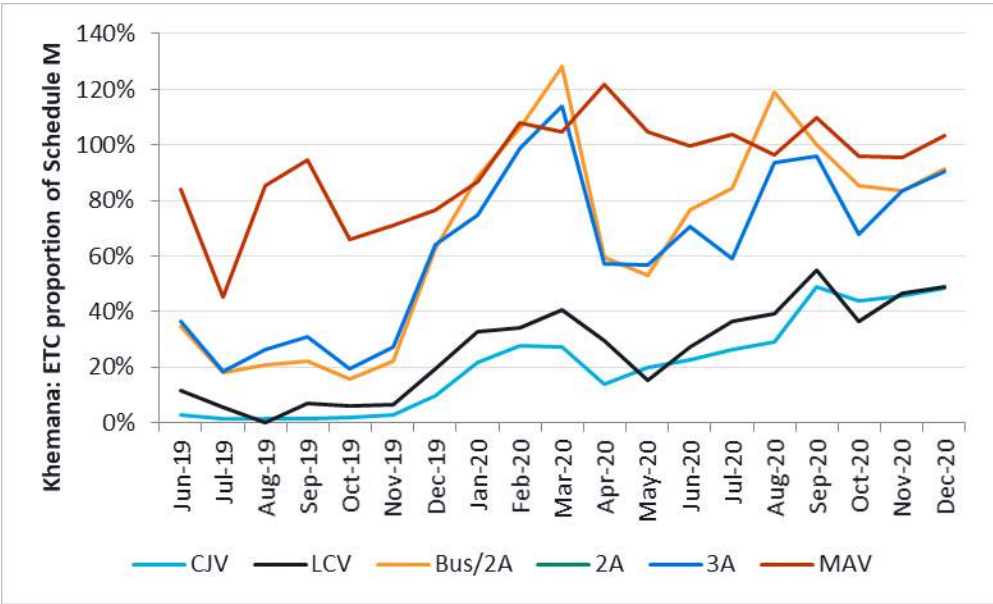
Date	ETC/FastTag Development
2014	FASTag system set up as a pilot on the Ahmedabad to Mumbai stretch of the Golden Quadrilateral, in November 2014 it was also implemented on the Delhi to Mumbai stretch of the Quadrilateral.
December 2019	FASTag is made mandatory on all National Highways and non-FASTag users are charged double the toll.
February 2021	FASTag is made mandatory for all vehicles at every toll plaza in the country starting Feb 15 2021.

Source: NHAI.gov.in and Wikipedia

- 3.48 In order to analyse the fast tag penetration on the Asset, we were provided the historical data from the NETC (national Electronic Toll Collection) servers of NHAI. This data was available starting April 2017 upto Dec 2020. In order to analyse the percentage of traffic using fast tag we compared the data from the NETC servers to the reported Schedule-M for the period Scehdule-M was available on each of the plaza. This is presented below for each of the toll plaza.

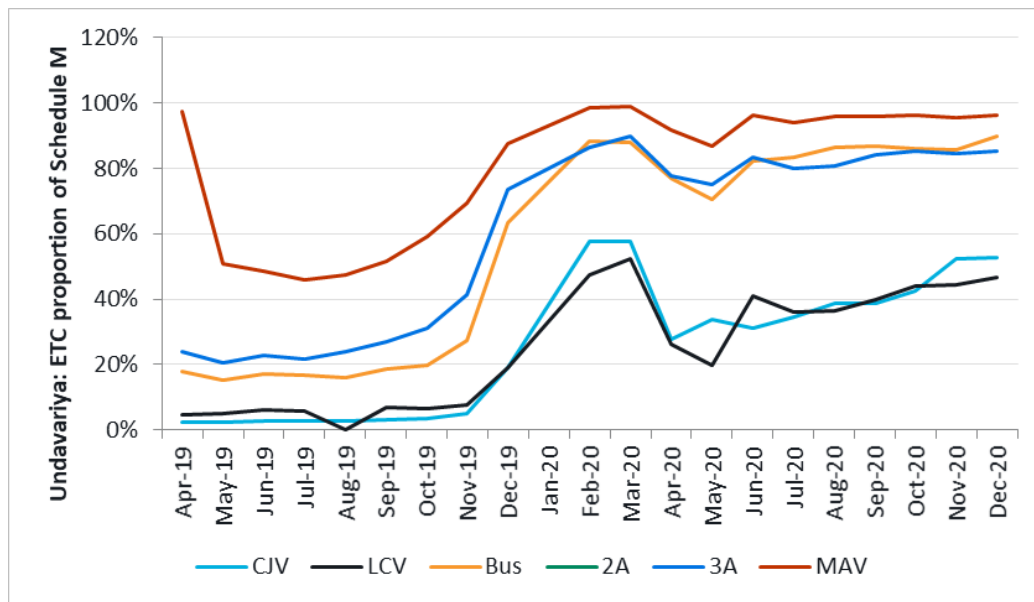
*Asset 1 Khemana and Asset 2 Undavariya*

**Figure 3.11: Proportion of Schedule-M traffic using fast tag/ETC, Asset 1 Khemana**



Source: Steer Analysis of NETC server and Schedule-M data

Figure 3.12: Proportion of Schedule-M traffic using fast tag/ETC, Asset 2 Undavariya

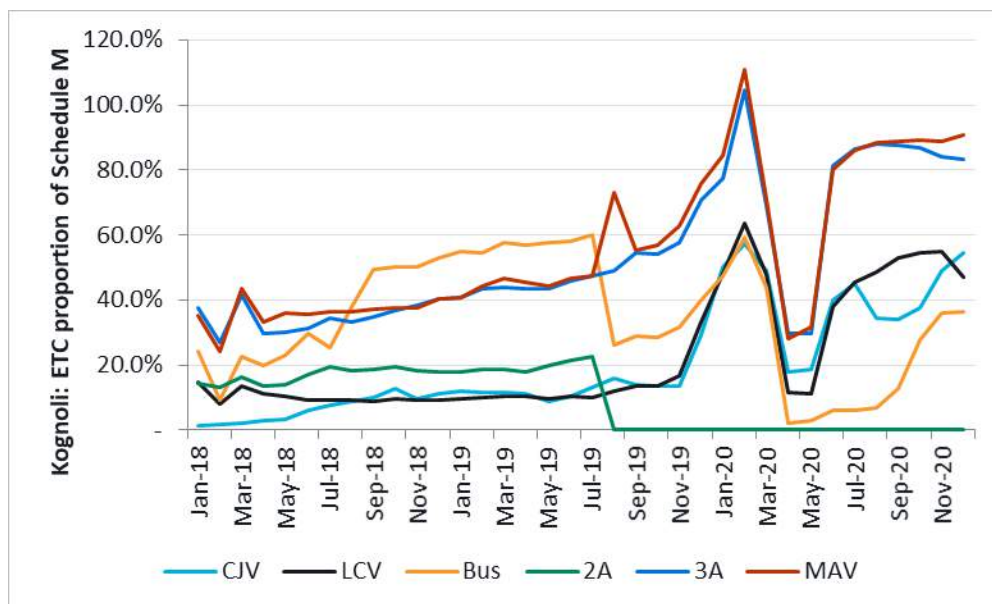


Source: Steer Analysis of NETC server and Schedule-M data

- 3.49 As we can see from the figures above, the reporting of Schdeule-M Khemana plaza is inconsistent since the share of ETC for some months goes above 100% however, in the last few months starting May' 20 we can see an increasing penetration of ETC across all categories. For Undavariya plaza, although the proportion of fast tag are more reasonable and below 100%, we can have some confidence on Schedule-M reporting, however, even then the ETC penetration levels are above 95% which are higher than other assets we have seen across a number of toll roads in the country and in the region.
- 3.50 For, both Asset 1 and Asset 2, the NETC server data is very reliable due to the digital nature of payments and the probability of under-reporting of this data is very minimal. Therefore, we believe that, the cash component of the traffic transactions on both these plazas are being under-reported which results in very high penetration levels of ETC across vehicle types. This was also confirmed by the comparison between Schedule-M and Volume count data discussed earlier.

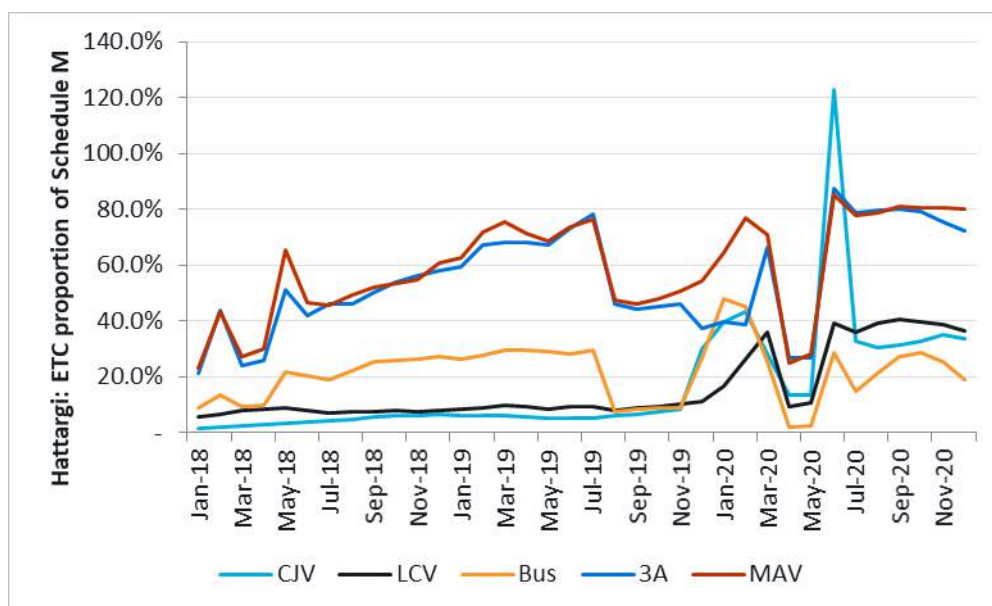
### Asset 3 Kognoli and Hattargi

**Figure 3.13: Proportion of Schedule-M traffic using fast tag/ETC, Asset 3 Kognoli**



Source: Steer Analysis of NETC server and Schedule-M data

**Figure 3.14: Proportion of Schedule-M traffic using fast tag/ETC, Asset 3 Hattargi**



Source: Steer Analysis of NETC server and Schedule-M data

- 3.51 As can be seen from the figures above, the ETC penetration levels reported on Asset 3 are within ranges of what that has been seen on nearby surrounding assets. They are still lower than some of the levels seen in Assets in Gujarat and Rajasthan since the Belgaum - Kagal area is not significantly industrialised and still caters to semi-urban/rural movements so lower levels of ETC penetration is expected.

- 3.52 It also can be inferred from the data that the penetration levels have been consistent and reporting of the Schedule-M data is of reasonably good quality. This was also confirmed by our comparison of volume counts to Schedule-M data.

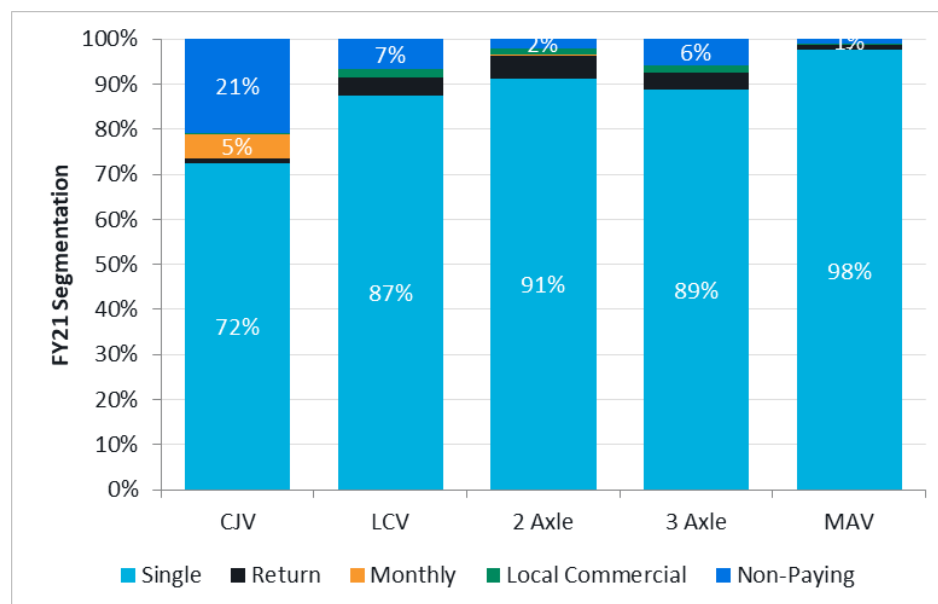
### Toll segmentation

- 3.53 This section presents the toll segmentation for all the assets. As discussed in the earlier sections Schedule-M reports data at a ticket level for each of the transaction undertaken. Therefore, we have taken the reported segmentation as a starting point to arrive at our assumptions for ticket type segmentation. The segmentation as per Schedule-M is presented below:

#### Asset 1 Palanpur-Abu Road and Asset 2 Abu Road-Swaroopganj

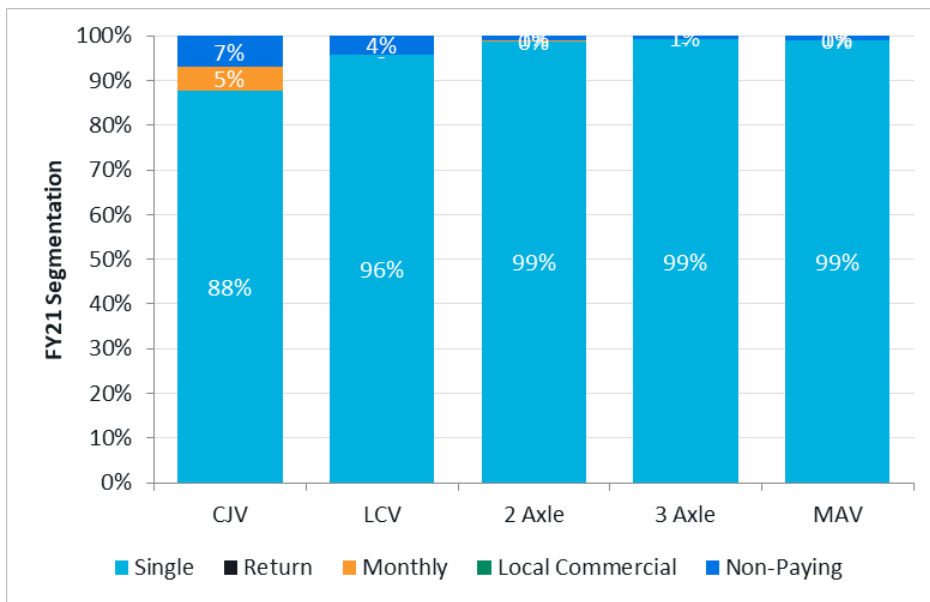
- 3.54 The charts below present the estimated segmentation based on traffic data from the latest months of FY21 for A1 TP1 Khemana and A2 TP1 Undavariya based on reported Schedule-M. As we can see from the charts below the reported levels of exemptions is as high as 21% at TP1 Khemana and 7% on TP2 Undavariya. This difference in exemptions can be due to the proximity of Khemana plaza to the city of Palanpur and other local issues.

Figure 3.15: Segmentation from Schedule-M data on Khemana toll plaza



Source: Traffic data for September-December 2020, Schedule-M

**Figure 3.16: Segmentation from Schedule-M data on Undavariya toll plaza**

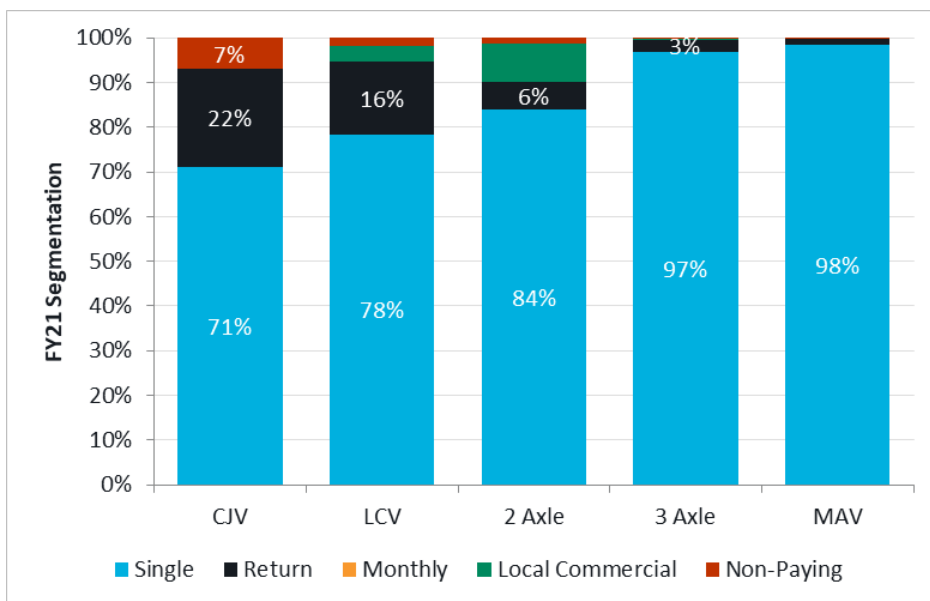


Source: Traffic data for September-December 2020, Schedule-M

### Asset 3 Belgaum-Kagal

3.55 Toll segmentation data for the year FY21 is presented in the charts below for TP1 Kognoli and TP2 Hattargi toll plazas.

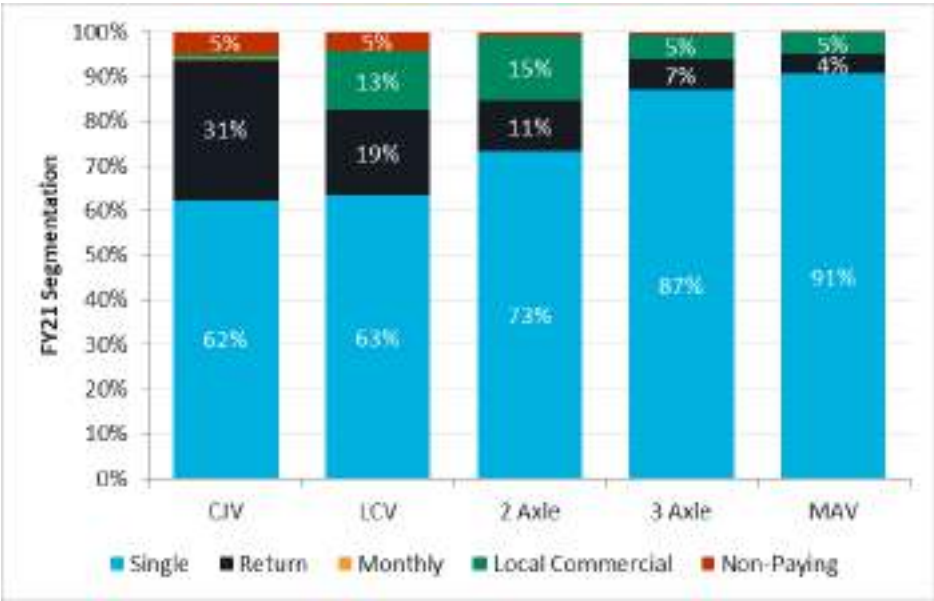
**Figure 3.17: Segmentation from Schedule-M data on Kognoli toll plaza**



Source: Traffic data for September-December 2020, Schedule-M



Figure 3.18: Segmentation from Schedule-M data on Hattargi toll plaza



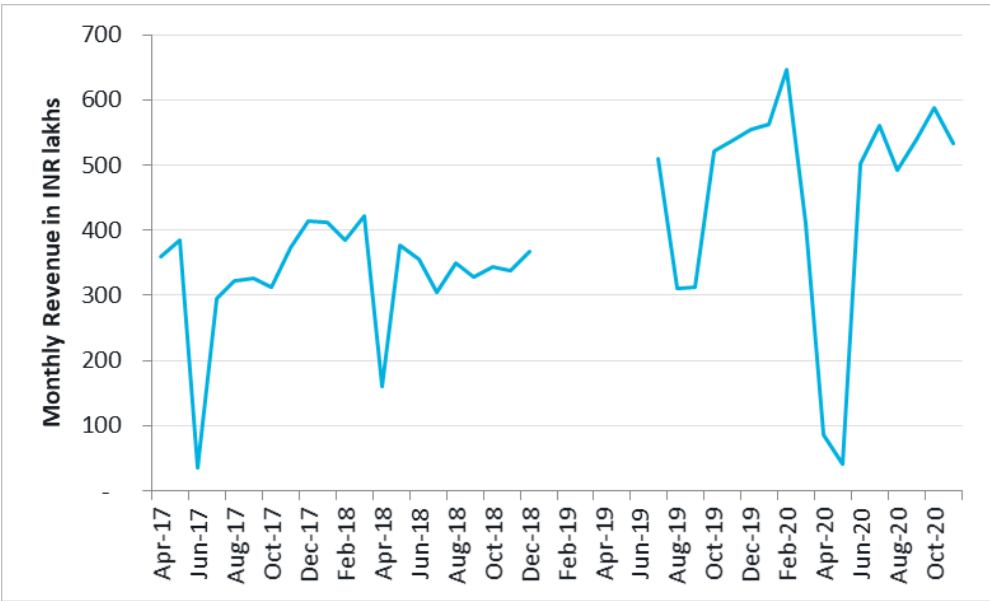
Source: Traffic data for September-December 2020, Schedule-M

3.56 We have used these segmentation assumptions as a starting point to estimate base segmentation for revenue estimation. This is discussed in detail in Chapter 4.

Historical revenues

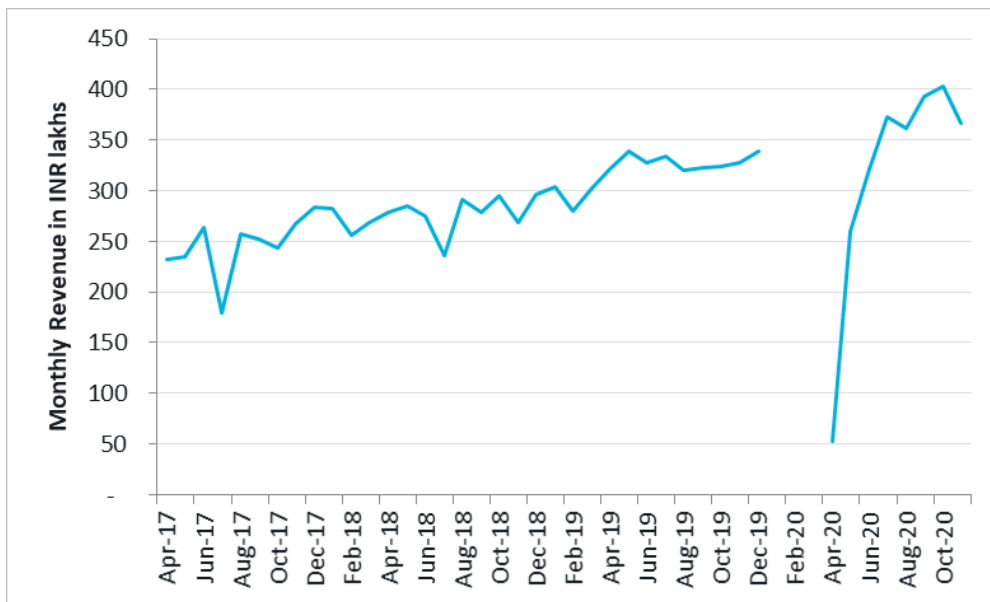
- 3.57 The figures below present the monthly reported revenues in Schedule-M data for the toll plazas at Assets 1 and 2. There are some gaps in the data on both plazas:
- Khemana revenue data has significant inconsistencies across the period. But an overall growth in revenues can be observed from the data available.
  - Undavariya revenues are more uniform and show increasing trends.

Figure 3.19: Historical revenues on Asset 1 TP1 Khemana



Source: Steer analysis of Client data

**Figure 3.20: Historical revenues on Asset 2 TP1 Undavariya**



Source: Steer analysis of Client data

3.58 The figures below present the monthly reported revenues in Schedule-M data for Asset 3 TP1 and TP2.

- Kognoli revenue data has some inconsistencies. The overall growth in revenues seems to be in a decreasing trend till Feb-20 (even prior to the COVID-19 pandemic) but has shown a fast increase since Apr-20.
- Hattargi has shown consistent trends till Dec-19 but has very erratic trends since then.

**Figure 3.21: Historical revenues on Asset 3 TP1 Kognoli**



Source: Steer analysis of Client data

**Figure 3.22: Historical revenues on Asset 3 TP2 Hattargi**



Source: Steer analysis of Client data

## Summary

- 3.59 Several different data sources including IHMCL, Schedule-M, DPR, IE reports and data from benchmark assets have been analysed and presented in detail in this chapter.
- 3.60 Each of the data points analysed point towards a sustained traffic growth on the Assets under consideration historically. That was also confirmed by analysing the traffic data from feeder Assets managed by private players who are known to manage their toll plazas professionally.
- 3.61 Payment through ETC mode have been consistently increasing on the Asset, with levels reaching up to 90% for heavy vehicles on Asset 1 and Asset 2, and up to 80% on Asset 3. These levels are consistent to levels we have seen on benchmark assets, providing further confidence in the data.
- 3.62 The impact of COVID-19 has been significant on all the Assets, however, a quick and sustained recovery in traffic levels to pre COVID-19 levels has been witnessed on all three Assets starting as early as June 2020 onwards. As these Assets lie on key national corridors connecting large industrial settlements and in the case of Asset 3 the Golden Quadrilateral.
- 3.63 In absence of consistent Schedule-M data, we have taken a triangulation approach by undertaking like for like comparison using multiple different data sources to confirm our assumptions.
- 3.64 The various data points presented in Chapter 3 feed into our assumptions of base traffic estimation, base revenue estimation, and growth assumptions which form the basis of our forecasts for these Assets discussed in detail In Chapter 4. We have then further validated the base position by validating our revenue forecasts with the reported revenue by the current contractors and the bid revenues, stated by prospective bidders for the Asset. Detailed analysis of which is presented in the next chapter, Chapter 4.

# 4 Base Traffic, Revenue and Growth Validation

## Introduction

- 4.1 In this chapter, we present our approach to arrive at the base position and assumptions for baseline (or background) traffic growth for each vehicle category on each Asset.
- 4.2 The two most important inputs that go into traffic and revenue forecasts are:
- The base position – both in terms of traffic and revenue levels currently being generated by an asset; and
  - The historical growth trends – which can be correlated to the various growth drivers and used to develop an informed view of the forecasts.
- 4.3 This chapter describes how the base position – in terms of traffic and revenue was established for the assets under consideration was derived from the information available. Thereafter, this chapter describes how the historical growth trends that were observed on the asset itself or on assets in close vicinity were used to develop the forecast views.

## Base traffic validation

- 4.4 Base year is the year on which long-term background forecast growth rates are applied to derive year-wise average annual daily traffic (AADT) estimates for forecast years. This is therefore an important aspect of our forecasting approach as baseline traffic and ultimately revenue forecasts for future years are built on top of the base year traffic estimate. We have used FY21 as the base year for AADT estimates for the forecast years.
- 4.5 As described previously in Chapter 3, to establish the base year (FY21) traffic position. We utilised information from various sources – including from the Client and our context knowledge, to assess a reasonable demand on the corridor for the base year FY21 which formed the basis of future year forecasts.
- 4.6 There were several gaps, as mention earlier, observed in the data presented in the DPR versus the independent counts conducted by IHMCL. Therefore, it was necessary to bring in data and information from other sources, such as Schedule M and benchmark corridors, to triangulate a robust base position.
- 4.7 With regards to the base year AADT assumption on all the Assets, it is important to note that our view is taken based on an underlying assumption that there will be no further lockdowns implemented in the country, more specifically in the regions having the biggest influence on baseline traffic growth on the Asset.

## Assets 1-2: Palanpur - Swaroopganj

4.8 Tables below list data obtained from various sources for Asset 1 and Asset 2 respectively, including the benchmark corridor for the Assets, i.e. BPP. To maintain consistency across various presented sources of information, the data below corresponds to the month of November 2020 (in FY21).

**Table 4.1: Asset 1 TP1 Khemana comparison of available counts in FY21 (November 2020)**

Sources	IHMCL	DPR	Schedule M	BPP (benchmark)
Month	Feb-19*	Nov-20	Nov-20	Nov-20
CJV	6,648	7,691	6,121	6,054
LCV	668	5423	513	377
Buses	-	420	-	438
2A	960	776	1,194	855
3A	1,668	1,125	811	911
MAV	3,333	4,659	3,797	5,281
Total	13,279	15,094	12,443	13,916
PCU	30,542	36,254	30,024	36,998

\*In case of Asset 1 TP1 Khemana, the IHMCL data was not available for Nov-20, then the most recent available month has been included

**Table 4.2: Asset 2 TP1 Undavariya comparison of available counts in FY21 (November 2020)**

Sources	IHMCL	DPR	Schedule M	BPP (benchmark)
Month	Nov-20	Nov-20	Nov-20	Nov-20
CJV	6,108	6,938	5,904	6,054
LCV	819	539	569	377
Buses	-	568	-	438
2A	1,151	719	1,278	855
3A	1,720	1,062	887	911
MAV	4,551	5,354	4,043	5,281
Total	14,363	15,180	12,688	13,916
PCU	36,492	38,887	31,479	36,998

4.9 As seen in the comparison above for both toll plazas,

- The Schedule-M data reports the lowest traffic possibly due to under-reporting of traffic.
- DPR counts are showing higher traffic estimates potentially due to the high traffic recovery due to pent-up demand<sup>4</sup> observed during Q2 and Q3 of FY21 at other toll roads across the country.

<sup>4</sup> The unprecedented situation due to COVID-19 impacts on industry and society has led to unusual and unexpected trends in traffic. As we understand from our experience on several toll roads across the country during the Unlock phases, we observed pent-up demand due to unlocking of the economy and destocking by manufacturers. This pent-up demand contributed in higher-than-normal traffic recovery



- 4.10 Therefore, we believe that the DPR (even with the pent-up demand) is a better ADT for AADT estimation. Comparing against the benchmark corridor (BPP), we have adjusted the November FY21 DPR counts traffic by 10% downwards to arrive at a normalised November traffic.

*Seasonality assumption for FY21 estimate*

- 4.11 The seasonality during the months of October and November vary depending on the Diwali month which may change from year to year. In FY20 Diwali was in the end of the month of October. Generally, if we take a period of 4 weeks with Diwali lying in between we see an uptick in traffic for the first 10-12 days then a decline due to Diwali holidays and a similar uptick in traffic in the last week, i.e. day 20 to day 28 approximately. Since Diwali was in end of October in FY20, and in early November in FY21, the average seasonality of October and November will be a better reflection of the seasonal trend.
- 4.12 Therefore, we have used the average SCFs of the two months for both the toll plazas where ADT from November is being used. The table below shows SCFs from various sources and the adopted SCFs.

**Table 4.3: SCFs derived from various sources and the adopted SCFs**

Data source	Asset	Corridor benchmark	Adopted
	DPR	BPP*	Steer
CJV	1.0	0.94	0.94
LCV	1.0	1.00	1.00
Bus/Truck	1.0	1.09	1.09
3A	1.0	1.02	1.02
MAV	1.0	1.05	1.05

Source: Steer analysis of Client and Steer data, \*Average SCF across October and November (FY20)

- 4.13 As seen above,
- The DPR has not considered a seasonal variation in November with respect to the annual average – considering an SCF of 1 across vehicle categories.
  - Whereas, the SCFs for the benchmark corridor, i.e. BPP data presents a more reasonable SCF trend for the given months.
- 4.14 Since the BPP is a long-standing asset with decent operating history, it could be established as the more reliable source based on actual traffic trends during the Diwali months. Therefore, we have adopted the same as reference for our SCF computations.

*Base year AADT*

- 4.15 Table 4.4 shows FY21 AADTs estimated using the counts and the SCFs, as presented in the previous sections. For the counts, we have utilised the DPR counts in case of both Asset 1 and Asset 2, and further applied the 10% suppression for the pent-up demand before multiplying with the adopted SCFs.

from COVID-19 impacts starting July/August onwards including in the months of October and November and December 2020.

**Table 4.4: Asset 1 and Asset 2 base AADT (FY21) estimates**

Asset	Asset 1 TP1 Khemana	Asset 2 TP1 Undavariya
CJV	6,481	5,847
LCV	379	483
Buses	360	487
2A	761	705
3A	1,033	975
MAV	4,402	5,058
<b>Total</b>	<b>13,416</b>	<b>13,555</b>
<b>PCU</b>	<b>33,318</b>	<b>35,834</b>

Source: Steer analysis of Client data

- 4.16 As seen from the table above the estimated base year PCUs are in-line with the range of confidence established in Chapter 3 for Asset 1 TP1 Khemana and Asset 2 TP1 Undavariya, once the appropriate adjustments for the pent-up demand are applied.

### ***A3 Belgaum-Kagal***

- 4.17 Table 4.5 and Table 4.6 below list data obtained from various sources for Asset 3 plazas, including the benchmark corridor. Again, to maintain consistency across various presented sources of information, the data below corresponds to the month of November 2020 (in FY21) where possible.
- 4.18 The traffic volumes in November 2020 (FY21) gathered from various sources – Asset (IHMCL), Independent Engineer (IE), Schedule-M and Belgaum-Dharwad – at the toll plazas Kognoli and Hattargi. The DPR reports counts from October 2020 which are also presented in the tables below.

**Table 4.5: Asset 3 TP1 Kognoli comparison of available counts in FY21 (November 2020)**

Sources	IHMCL	DPR	IE	Schedule M	Belgaum-Dharwad
Month	Nov-20	Oct-20*	Nov-20	Nov-20	Nov-20
CJV	10,203	8,361	11,047	8,950	7,312
LCV	1,888	1,915	1,950	1,425	2,209
Buses	-	503	755	2,239	795
2A	2,022	942	1,129	-	2,307
3A	1,207	973	999	887	577
MAV	1,503	1,628	1,583	1,492	2034
<b>Total</b>	<b>16,827</b>	<b>14,326</b>	<b>17,464</b>	<b>14,995</b>	<b>15,233</b>
<b>PCU</b>	<b>29,504</b>	<b>25,832</b>	<b>29,749</b>	<b>27,186</b>	<b>30,812</b>

\*The DPR data was not available for Nov-20, therefore the most recent available month has been included

**Table 4.6: Asset 3 TP3 Hattargi comparison of available counts in FY21 (November 2020)**

Sources	IHMCL	DPR	IE	Schedule M	Belgaum-Dharwad
Month	Nov-20	Oct-20*	Nov-20	Nov-20	Nov-20
CJV	9,705	8,712	10,671	10,206	7,312
LCV	1,807	2,061	2,147	2,124	2,209
Buses	-	723	832	3,378	795
2A	3,163	1,266	1,989	-	2,307
3A	1,242	1,025	1,183	1,049	577
MAV	1,677	1,663	1,643	1,647	2034
<b>Total</b>	<b>17,598</b>	<b>15,454</b>	<b>18,467</b>	<b>18,410</b>	<b>15,233</b>
<b>PCU</b>	<b>33,195</b>	<b>28,347</b>	<b>33,306</b>	<b>34,113</b>	<b>30,812</b>

\*The DPR data was not available for Nov-20, therefore the most recent available month has been included

*Seasonality assumption for FY21 estimate*

- 4.19 As mentioned earlier, typically the seasonality during the months of October and November vary on Indian roads depending on the Diwali month which may change from year to year. The average seasonality of October and November thus generally tends to be stable. Therefore, we have used the average SCFs of the two months for both the toll plazas where ADT from November is being used. The table below shows SCFs from various sources and the adopted SCFs.

**Table 4.7: SCFs derived from various sources and the adopted SCFs**

Data source	Asset	Corridor benchmark	Adopted
	DPR	Belgaum-Dharwad*	Steer
CJV	1.0	0.99	0.99
LCV	1.0	1.08	1.08
Bus/Truck	1.0	1.03	1.03
3A/MAV	1.0	1.03	1.03

Source: Steer analysis of Client and Steer data

\*Average SCF across October and November (FY20)

- 4.20 Again, as was mentioned in the case of Asset 1 and Asset 2, the DPR has not considered a seasonal variation in November with respect to the annual average – considering an SCF of 1. Whereas. The benchmark corridor, i.e. Belgaum-Dharwad presents a more reasonable SCF trend.
- 4.21 Further, the data for Belgaum-Dharwad corridor was available for over seven years, and the SCFs were estimated using entire historical period, excluding outlying years like FY17, due to effect of demonetisation.

*Base year AADT*

- 4.22 Table 4.8 shows FY21 AADTs estimated using the counts and the SCFs, as presented in the previous sections. For the counts, we have utilised the IE counts, and further applied suppression to car traffic only before multiplying with the adopted SCFs.

**Table 4.8: Asset 3 base AADT (FY21) estimates**

Asset	Asset 3 TP1 Kognoli	Asset 3 TP2 Hattargi
CJV	9,984	9,669
LCV	2,110	2,324
Buses	778	858
2A	1,164	2,051
3A	1,027	1,217
MAV	1,628	1,690
<b>Total</b>	<b>16,694</b>	<b>17,810</b>
<b>PCU</b>	<b>29,391</b>	<b>33,144</b>

Source: Steer analysis of Client data

## Revenue validation

### Estimation of Base revenue

- 4.23 To estimate the base revenue for each of the toll plaza, we used the estimated FY21 AADT, established as part of the analysis above, as the assumptions for base FY21 traffic. We then used the segmentation assumptions, discussed in chapter 3, as a starting point to arrive at the base year revenue. This is further discussed in the sections below.

#### *Asset 1 and Asset 2*

- 4.24 As discussed in chapter 3, the schedule-M data for Asset 1 and Asset 2 has shown inconsistency and there are considerable differences in the comparison between volume counts and Schedule-M data, also presented in the table below.
- 4.25 To arrive at a segmentation for FY21, we adjusted the differences between the counts and Schedule-M data within the 'non-paying' category assuming that this difference is either under-reporting of data or genuine non-toll paying traffic which is currently not been recorded in the TMS systems of the toll plaza operator. However, to be conservative in our toll revenue estimation, we believe the difference in volume counts and Schedule-M data should be included in the Non-Paying category. We have adjusted the Schedule-M segmentation of Assets 1 and 2 using the below assumptions.

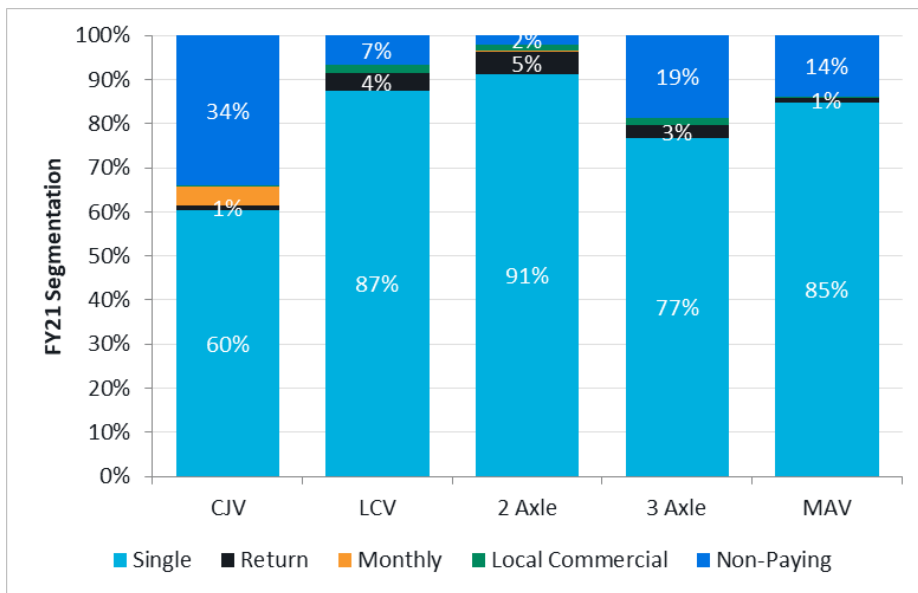
**Table 4.9: Difference in Schedule-M traffic volume and counts for November-20 used to estimate FY21 AADT**

Plaza		Adjusted counts	Schedule-M	Difference
Khemana	CJV	6,922	6,121	13%
	3A+MAV	5,206	4,609	13%
Undavariya	CJV	6,244	5,904	6%
	3A+MAV	5,774	4,931	17%

Source: Steer analysis of Client data

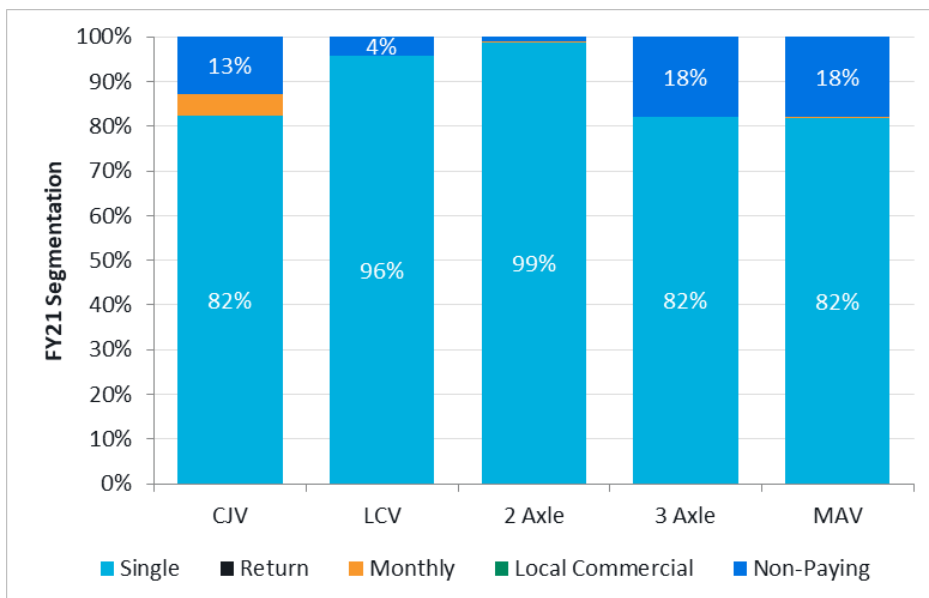
- 4.26 The final segmentation thus estimated and used in our forecasting process is presented in the charts below.

**Figure 4.1: Adopted FY21 segmentation for Khemana toll plaza**



Source: Steer analysis based on Client data

**Figure 4.2: Adopted FY21 segmentation for Undavariya toll plaza**



Source: Steer analysis based on Client data

4.27 Using the above assumptions of FY21 AADT and segmentation, we have calculated the FY21 revenue. We then validate the estimated revenue against two revenue sources:

- Source 1 (S1): Bid revenues for contracts
- Source 2 (S2): Revenue reported in Schedule-M

4.28 The following is the revenue estimate for Khemana and Undavariya toll plaza



**Table 4.10: FY21 revenue (INR Crore) estimates as compared to sources, Asset 1 and 2**

	Source 1	Source 2	Steer FY21	vs S1	vs S2
Khemana	62.18	62.88	70.02	12.6%	11.3%
Undavariya	42.93	46.88	49.30	14.8%	5.2%

Source: Steer Analysis

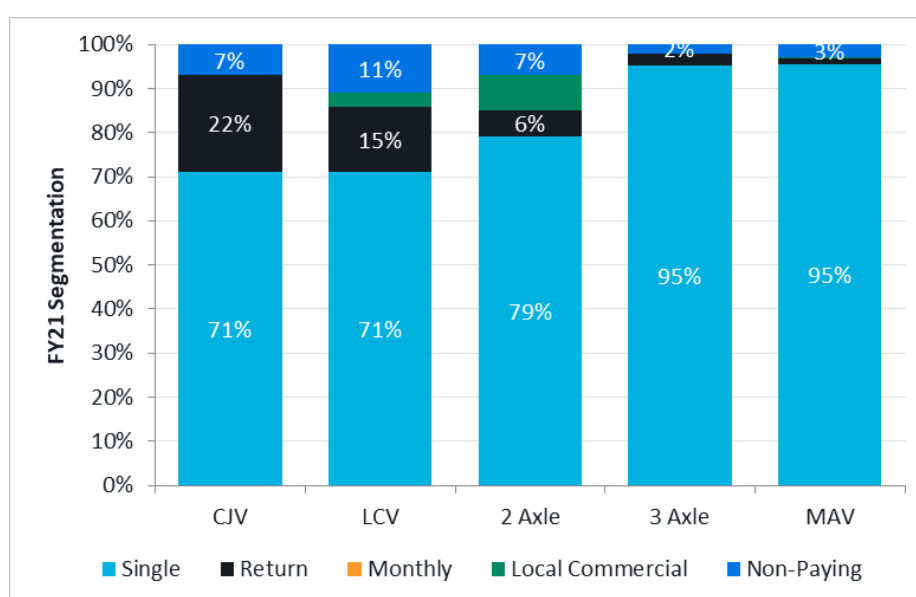
4.29 As we can see that compared to Source 1, Steer revenues are 12%-14% higher than S1, which is a reasonable margin considering the bidders typically account for costs plus margin to operate toll plazas.

4.30 We, therefore, believe that the estimated base position is a reasonable reflection of the FY21 traffic and revenue on Asset 1 and Asset 2.

### Asset 3

4.31 In case of Asset 3, as discussed in chapter 3, we have again relied on Schedule-M segmentation. In case of Kognoli plaza, we found that the segmentation in the DPR provides values of 'non-paying' category that is within reasonable ranges. Therefore, we adjusted the segmentation to adopt 'non-paying' category from DPR data. The final base year segmentation for Kognoli is presented below.

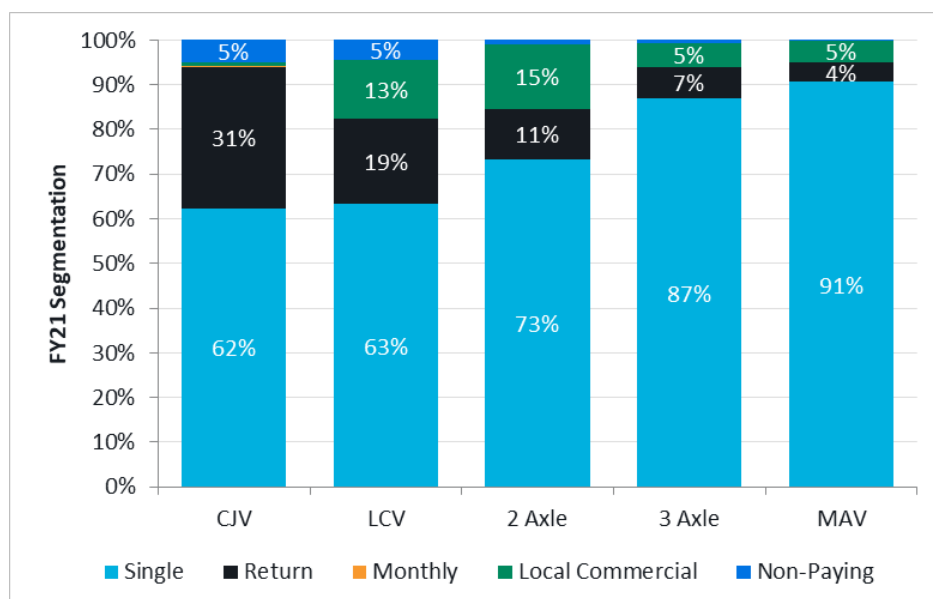
**Figure 4.3: Adopted FY21 segmentation for Kognoli toll plaza**



Source: Steer analysis based on Client data

4.32 For Hattargi plaza, the segmentation in the DPR and that estimated from Schedule-M are nearly identical. Therefore, we adopted the Schedule-M segmentation without any adjustments on Hattargi.

**Figure 4.4: Adopted FY21 segmentation for Hattargi toll plaza**



Source: Steer analysis based on Client data

4.33 Using the above assumptions of FY21 AADT and segmentation, we have calculated the FY21 revenue. We then validate the estimated revenue against two revenue sources:

- Source 1 (S1): Bid revenues for contracts
- Source 2 (S2): Revenue reported in Schedule-M

4.34 The following is the revenue estimate for Kognoli and Hattargi toll plaza.

**Table 4.11: FY21 revenue estimates as compared to sources, Asset 3**

FY21 Revenue	Source 1	Source 2	Steer FY21	vs S1	vs S2
Kognoli	77.52	79.08	78.47	1.2%	-0.8%
Hattargi	32.01	38.75	34.80	8.7%	-10.2%

Source: Steer analysis

4.35 As we can see from the table above as compared to source 1, our estimates are 1-8% higher than the bid value, which we believe to be a reasonable percentage of profit margins on an annual basis. Further, since these are annual contracts signed off in the middle of FY21, the toll revisions of FY22 will come into consideration, which will justify the delta between Steer estimates and bidders. We further believe that since reporting is reasonable on the plaza, the competition is higher in bidding and there may be aggressive bids being put by the bidders.

4.36 Considering all these factors, we believe our FY21 estimates for base revenue and AADT is a reasonable reflection of the actual situation on the ground.

### Growth validation

4.37 Elasticities, in the case of traffic growth, are the relationships between traffic growth and the growth in the drivers of traffic demand (GSDP etc.). When multiplied with forecasts of said growth drivers, they provide the forecasts of background traffic growth rates. However, as discussed in detail in chapter 3, given the gaps in continuous and consistent data availability

on these Assets it was infeasible to conduct a traditional statistical based growth and regression-based analysis to estimate underlying elasticity assumptions for future growth.

- 4.38 Further, the historical data points in Chapter 3 present an underlying growth trend and magnitude of traffic volumes across various vehicle categories. We have therefore relied on the growth profile of the surrounding Asset, and our experience of working on various assets in the regional setting of the respective toll plazas. The recommended elasticities presented in this section are therefore benchmarked to these assets and based on our regional knowledge.

#### Asset 1 and Asset 2

- 4.39 The table below presents the growth drivers identified to model the forecast background traffic growth rates at each of the two Assets. As the Assets are located across two states Rajasthan and Gujarat, we believe that the GSDP growth of both states will contribute to light vehicle (CJV, LCV), bus and 2As growth. As mentioned before, the growth of 3As and MAVs is expected to be driven by national GDP.

**Table 4.12: Identified growth drivers to model traffic growth at Asset 1 TP1 Khemana and Asset 2 TP1 Undavariya**

Growth driver	GDP India	GSDP Rajasthan	GSDP Gujarat
Car	--	50%	50%
LCV	--	50%	50%
Bus	--	50%	50%
2A	--	50%	50%
3A	100%	--	--
MAV	100%	--	--

Source: Steer analysis

- 4.40 The sections below detail out the reasoning for selection of respective growth driver(s) for each vehicle category.

**Table 4.13: Elasticity recommendations for Asset 1 and Asset 2**

Vehicle Category	Proposed	Growth Driver	Comments
CJV	TP1: 1.1 TP2: 1.1	TP1: Gujarat GSDP, Rajasthan GSDP TP2: Gujarat GSDP	Car traffic is local in nature and feeding key cities of Palanpur, Deesa among others. Volumes are low, but there is was visible development in cities of Palanpur, Radhanpur, Deesa. Towns such as Patan are also growing. Both toll plazas are expected to grow with a higher 1.1 elasticity to GSDP due to its proximity to Palanpur, Udaipur, and Mount Abu.
Buses	0.5	TP1: Gujarat GSDP, Rajasthan GSDP TP2: Gujarat GSDP	Buses are primarily a mix of public and private inter-city buses. It seemed that buses currently are serving local intercity demand. As these cities grow, the buses are also expected to respond to the increasing demand however only at a muted rate.
LCV	0.50	TP1: Gujarat GSDP, Rajasthan GSDP TP2: Gujarat GSDP	LCV have been observed to carry a mix of commodities, mostly catering to local demand. As these cities grow, we expect the consumption of these to also increase.

Vehicle Category	Proposed	Growth Driver	Comments
2A	0.30	TP1: Gujarat GSDP, Rajasthan GSDP TP2: Gujarat GSDP	2A are very low in volume on the corridor and mostly local. With the allowance of more tonnage under the axle load revisions, this category has witnessed growth over the last couple of years. Therefore, an elasticity of 0.3 is considered reasonable for this category.
3A	0.4	GDP	3A and MAV's are making long distance movements catering to the key Ports in India which are growing. Further they feed into Morbi which generate and consume different finished goods and raw materials respectively. City of Gandhidham is a big intermediate industrial hub, further IOCL has a large Oil facility in the Kandla Cluster. The Assets also feed into the markets of Mehsana and Ahmedabad. All these industries are expected to continue to contribute to the growth of the Asset. Hence, we expect a healthy MAV elasticity of 0.9 on the corridor. This is also benchmarked to the feeder asset in the North which has shown similar historical trends for heavy vehicles.
MAV	0.9	GDP	

Source: Steer Analysis

### Asset 3: Belgaum-Kagal

- 4.41 The table below presents the growth drivers identified to model the forecast background traffic growth rates on the Asset.

### Assumptions of background growth elasticities

- 4.42 The table below presents the growth drivers identified to model the forecast background traffic growth rates at each of the two toll plazas TP1 Kognoli and TP2 Hattargi on A3. As for the previously described Assets 1 and 2, this Asset is also located across two states (Karnataka and Maharashtra), and hence the GSDPs of each are expected to drive light vehicle (CJV, LCV), bus and 2As growth as shown below.

**Table 4.14: Identified growth drivers to model traffic growth at A3 TP1 Kognoli and TP2 Hattargi**

Growth driver	GDP India	GSDP Karnataka	GSDP Maharashtra
Car	--	50%	50%
LCV	--	50%	50%
Bus	--	50%	50%
2A	--	50%	50%
3A	100%	--	--
MAV	100%	--	--

Source: Steer analysis

- 4.43 The sections below detail out the reasoning for selection of respective growth driver(s) for each vehicle category.

**Table 4.15: Elasticity recommendations for Asset 3**

Vehicle Category	Proposed	Growth Driver	Comments
CJV	0.8 ramping up to 1.0 by FY27	Karnataka GSDP, Maharashtra GSDP	CJVs on this asset have maximum movement between Belgaum, Dharwad, Hubli and other local destinations like the high court bench at Dharwad. CJVs have grown consistently. With the increase in urbanisation and trip generators along the asset, cars are expected to grow faster in the near future, therefore we have assumed a ramp up in CJV elasticity.
Buses	0.3	Karnataka GSDP, Maharashtra GSDP	Buses are primarily a mix of public and private inter-city buses. It seemed that buses currently are serving local intercity demand. As these cities grow, the buses are also expected to respond to the increasing demand however only at a muted rate.
LCV	0.4	Karnataka GSDP, Maharashtra GSDP	Both LCV (including Mini-LCVs that pay the same tolls as CJV) and 2A are expected to cater to the local demand, apart from medium-distance courier/parcel traffic and agricultural traffic. Both LCVs and 2As ply at high volumes on the Asset. Considering the above observations, and our experience across other toll roads in the region, we believe that elasticities of 0.4 and 0.3 - with respect to state GSDPs of Karnataka and Maharashtra at 50% contribution each - are considered reasonable for LCVs and 2A respectively
2A	0.3	Karnataka GSDP, Maharashtra GSDP	
3A	0.5	GDP	3As and MAVs on the Asset make long-distance movements on the Golden Quadrilateral corridor connecting Mumbai with Bangalore, Chennai and other regions in Karnataka, Tamil Nadu, and Kerala. A variety of commodities ranging from agricultural, courier/parcels to automotive products (cars and spare parts) are expected to be using the Asset. Hence, given the strategic nature of heavy truck movement on the Asset, we expect that a healthy background growth will continue with elasticities of 0.8 for MAVs and 0.5 for 3As at both TP1 Kognoli and TP2 Hattargi.
MAV	0.8	GDP	

Source: Steer Analysis

### Forecast summary for background elasticities

- 4.44 The table below presents a summary of the assumed forecast elasticities for background traffic growth at all three Assets.



**Table 4.16: Assumed forecast elasticities for background growth forecasts**

Vehicle type	Growth driver	Forecast	
		Assumed forecast elasticity	Evolution of elasticity
A1-2 Palanpur-Swaroopganj – A1 TP1 Khemana and A2 TP1 Undavariya			
Car	GSDP Rajasthan/Gujarat	1.1	No change
LCV	GSDP Rajasthan/Gujarat	0.5	No change
Bus	GSDP Rajasthan/Gujarat	0.5	No change
2A	GSDP Rajasthan/Gujarat	0.3	No change
3A	GDP	0.4	No change
MAV	GDP	0.9	No change
A3 Belgaum-Kagal - TP1 Kognoli and TP2 Hattargi			
Car	GSDP Karnataka/Maharashtra	0.8	Ramping up to 1.0 in FY27
LCV	GSDP Karnataka/Maharashtra	0.4	No change
Bus	GSDP Karnataka/Maharashtra	0.3	No change
2A	GSDP Karnataka/Maharashtra	0.3	No change
3A	GDP India	0.5	No change
MAV	GDP India	0.8	No change

Source: Steer analysis of Client data

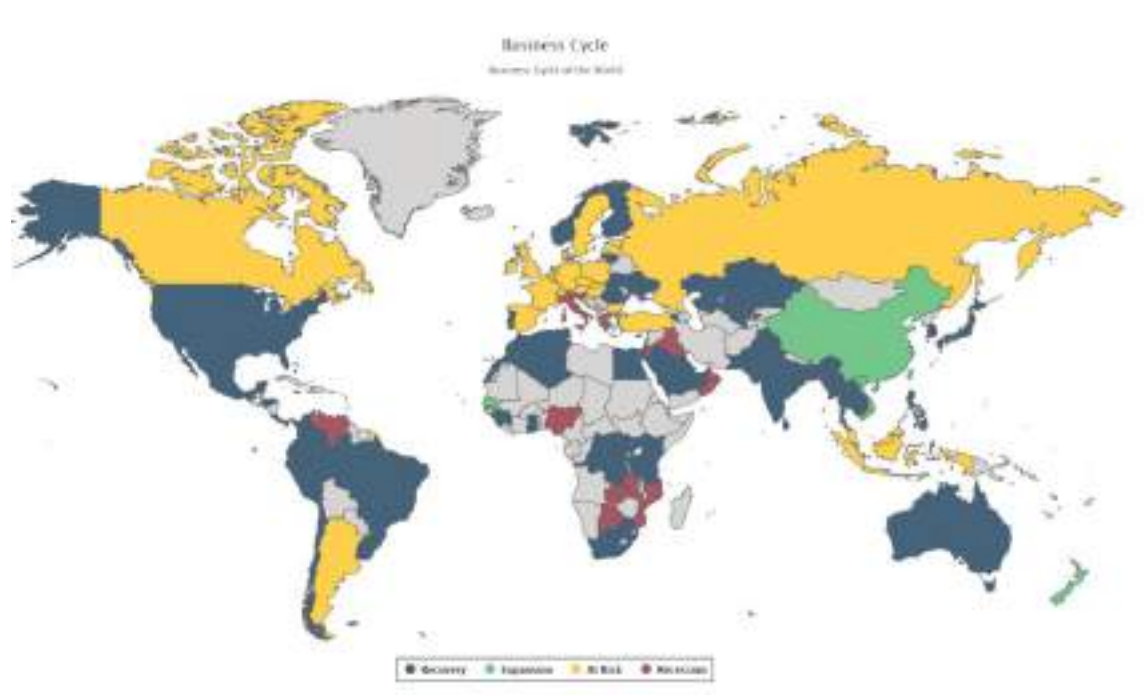
## Forecasts for growth drivers

- 4.45 In this section, we have described our assumptions in relation to forecasts of the key macro-economic drivers of traffic growth. India's GDP and the relevant state GSDPs are the primary macroeconomic variables that have been used to drive our traffic growth forecasts.

### National GDP

- 4.46 For the past 2 decades, the Indian economy has grown at an average of about 7% annually. Between 2014-2018, India was the fastest growing major economy globally. In the year 2019-20, there was a trend of economic downturn observed in the country, nevertheless, with government initiatives such as Make in India, and Production-Linked Incentive (PLI) scheme, the national economy was expected to improve.
- 4.47 However, while the Indian economy was looking to recover, the COVID-19 pandemic began in March FY20. Lockdowns implemented to varying degrees across the world have crippled economies for several months. While nearly all major economies are expected to witness negative or near zero growth in FY21, India is proving to be one of the countries where a considerable recovery is recorded in the second half of FY21.
- 4.48 The figure below shows the economic standing of different countries in the world, as of February 2021.

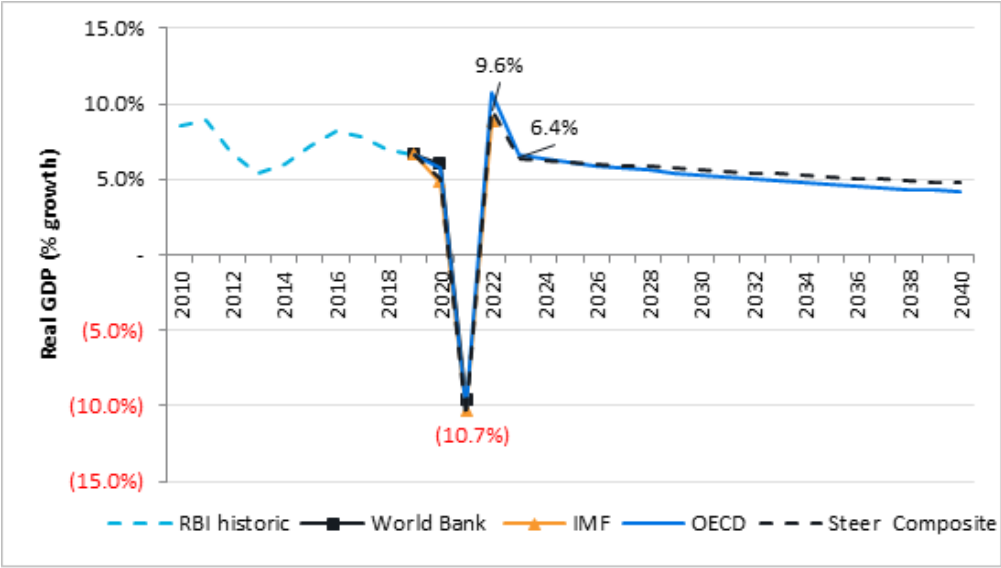
Figure 4.5: Global economic standing in February 2021



Source: Economic.com, Moody's analytics

- 4.49 Various organisations like the World Bank, International Monetary Fund (IMF) and Asian Development Bank (ADB) and other rating agencies have projected India's GDP ranging from -9% to -14% for FY21, which is largely the effect of peak of the pandemic observed during the first half of the year. However, going forward, the GDP is expected to gain impetus in FY22.
- 4.50 Steer's assumed GDP forecast is a composite line of long-term forecasts from sources such as Consensus, OECD, and short-term forecasts by the World Bank, IMF, Economic Intelligence Unit (EIU) of the Economist Group and Reserve Bank of India (RBI)
- 4.51 As per these sources (shown in the chart below), GDP would fall by over 10% in FY21. It is expected to recover strongly by 9.6% in FY22, and 6.4% in FY23. Subsequent years are assumed to taper down gradually to a 5.7% growth in FY30, 4.8% by FY40 and 4% by FY50.

Figure 4.6: Steer composite GDP line shown with various forecast sources

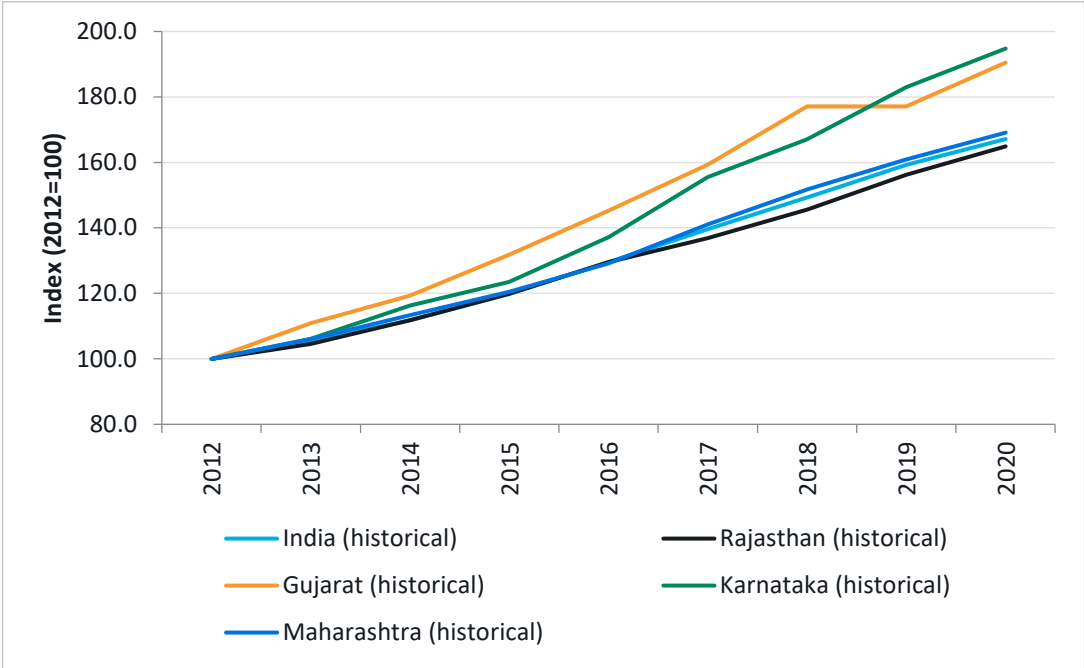


Source: Steer analysis of various forecast sources on national GDP

State GSDPs

- 4.52 In order to estimate future values for GSDP in the absence of publicly available forecasts, we assume that as the Indian economy grows, the states which have historically grown at a faster pace than the national average will, over 10 years, see a slowdown in GSDP growth, tending to the national average. Similarly, the states which are currently considered to be ‘lagging’ are assumed to pick up momentum and grow faster than the national GDP and eventually converge to GDP.
- 4.53 By comparing historical trends of GSDP growth with the national GDP growth, we have therefore established GSDP projections for both the states.

Figure 4.7: Comparison of historical GSDP growth and GDP growth



Source: Steer analysis of published economic parameters

- In the case of Rajasthan, we assumed that the GSDP will begin to grow slightly higher than the national GDP given the primarily agricultural nature of the State economy historically and recent progress in development and urbanisation. The tertiary sector (tourism) is significant but not expected to take the growth trajectory higher than GDP growth. We assume that the GDP-GSDP gap will fully converge to national GDP by FY45.
- For Gujarat, we assume that the GSDP will continue to stay higher than GDP in the short-medium term as observed historically, considering the pro-industry policies of the state, long history of ports, trade and business centres, and the fast-urbanising cities of the state. We have considered the GSDP growth rates to taper to 4.8% in FY48.
- In the case of Karnataka, we assumed that the GSDP will continue to remain slightly higher than the national GDP, as seen historically in the long-term. The large tertiary sector (IT, ITES) economy of the capital city of Bangalore is expected to continue to lead the economic growth.
- For Maharashtra, we assume that the GSDP will remain roughly in line with the national GDP, considering that the state is the most industrialised with the largest economy in the country. Mumbai's financial and business centres drive the larger share of the state's economic growth.

## 5 Traffic and revenue forecasts

### Introduction

- 5.1 Following the discussion on establishment of base year and assumed forecast background growth rates in the previous chapter, this chapter first deals with the forecasting assumptions around potential impacts on traffic growth on the Asset. Later, it also presents the assumed toll segmentation, trip factors and evolution of toll rates for the forecast period which are used to estimate the forecast revenue based on the forecast traffic. In the final section, the chapter summarises the traffic growth rates for the forecast years. The following table lists key final outputs that have presented in chapter 5, along with chapter references for the inputs.

**Table 5.1: Key intermediate and final outputs in the forecast**

Forecast	Final outputs	Intermediate outputs	Inputs	Chapter covering Inputs
Traffic	Base year AADT FY21 and FY22	ADT, SCF estimate for base year	Historical SCF and year-to-date AADT	Chapter 3
	Background traffic growth	Background forecast elasticity	Background historical growth	Chapter 3
		Forecasts for growth drivers	Historical performance of growth drivers along with GDP line	Chapter 4
	Impact growth rates and staging	Impacts	Asset vs alternate route costs for ongoing/upcoming network and other developments	Chapters 2, 5
Revenue	Annual/daily revenue forecasts	Forecast toll segmentation: Trip frequencies	Historical trip frequencies	Chapter 3
		Future toll rates	Toll charge estimation	Chapter 5

Source: Steer

- 5.2 All traffic is presented as AADT by vehicle category at each plaza, for financial years (April-March). All revenue is presented in Rupees (nominal terms). We have presented summary forecasts until FY50 in this chapter. Appendix A presents detailed forecasts until FY50.

### Forecast impacts

- 5.3 This section below details the impacts which we believe would affect traffic on the Asset during the concession period. As discussed earlier in Chapter 2, to assess the impacts on the Asset, whether positive or negative, we have studied developments (alternate roads, feeder roads and alternate modes) in the surrounding road network.



## Upcoming network developments

- 5.4 For all three Assets, the following table presents the upcoming network/other developments, corresponding alternate/feeder routes, year of completion and indicative direction of impact on the Asset.

**Table 5.2: List of network/other developments**

S. No.	Development	Route affected	Year of completion	Asset affected	Impact (+/-)
1.	Two-laning upgrade of Udaipur-Sirohi-Tharad road sections	Trips between Udaipur/north and Radhanpur/south	FY21	Assets 1-2 Palanpur-Swaroopganj	-ve
2.	Completion of Western Dedicated Freight Corridor (WDFC)	Long-distance trips carrying bulk commodities	FY22	Assets 1-2 Palanpur-Swaroopganj	-ve
3.	Four-laning of Hosapete-Chitradurg (NH52-NH50)	Trips between Mumbai/Pune/western Indian region and Bangalore Trips between Mumbai/Pune/western Indian region and Chennai	FY22	Asset 3 Belgaum-Kagal	-ve
4.	Four-laning of Solapur-Bijapur (NH52-NH50)		FY22		
5.	Six-laning of Hubli-Chitradurga		FY22		
6.	Four-laning of Solapur-Humnabad		FY24		
7.	Completion of Pune Ring Road		FY26		

Source: Steer analysis

- 5.5 The subsections below include a narrative of each of the improvements, as listed in the table above, and impacts associated from each of these on the corresponding Assets.

## Analysis of potential impacts

- 5.6 For potential road-to-road diversions due to network improvements, we have used generalised journey cost (GJC) analysis to understand potential impacts on the Assets. The GJC costs combine distance (fuel), time and toll costs on the two routes in question and model the diversions using a logit/gravity model between the route choices to estimate potential diverted traffic. The in-scope (divertible) traffic on which the analysis is carried out is estimated from benchmark origin-destination (OD) survey data from neighbouring toll roads on the corridor network and based on our experience across the region.
- 5.7 For intermodal competition, we have followed a customised approach as explained further in the section for WDFC.

## ***A1-2 Palanpur-Swaroopganj***

### *Network development on Udaipur-Sirohi-Tharad corridor network*

- 5.8 The Asset is part of the long-distance corridor network connecting Rajasthan and the northern Indian states with the western Gujarat region, particularly industries and ports in the Kutch and Morbi region. Southbound trips from Delhi and the northern states plying via Jaipur enter Gujarat through Udaipur and Pindwara. This traffic market however has two options to reach Radhanpur:
- Alt 1: Via Pindwara-Abu Road-Deesa-Radhanpur (hereafter called 'Asset route')
  - Alt 2: Via Pindwara-Sirohi-Tharad (hereafter called 'Alternate route')
- 5.9 Road sections on the Alternate route are currently undergoing upgrades from single lane to two-lane configuration under NH168 upgrade. While the Pindwara-Sirohi section being without a toll plaza will not entail tolls (though part of the tolled BPP toll road Asset), the Sirohi-Tharad section will be tolled after attainment of commercial operations date (COD), which expected by March 2021<sup>5</sup>.
- 5.10 The Tharad - Radhanpur connection via Bhabhar has two sections: State highway section of Tharad - Bhabhar, and national highway section of Bhabhar - Radhanpur NH68. is currently not tolled. The map below shows the road network surrounding the Asset.

<sup>5</sup> As per information provided by the Client (letter NH-15017/5/2019/P&M, that the NH168 is currently under upgrade by State of Gujarat and will be handed over to NHAI for operation starting FY22

Figure 5.1: Route analysis via Alt 1 (via Asset) and Alt 2 for Asset 1 and 2



Source: Steer analysis and cartography

- 5.11 To assess the impact on the toll plazas on the Asset toll plazas due to completion of upgrade of the Sirohi-Tharad section, we have carried out a GJC-comparison analysis between the Asset and Alternate routes based on the distance, time and toll costs presented in the figures and table below. As shown, the post-upgrade scenario sees an improvement in speeds (time savings of about an hour) with increase in tolls. There is an overall decrease in GJC on the alternate route. This causes diversion of traffic away from the Asset route in FY22.

Table 5.3: Costs for MAV on the Asset and alternate routes compared for the current and post-upgrade scenarios

Costs for MAV	Current scenario Alternative 1 via Asset route	Current scenario Alternative 2 via Tharad	Post-upgrade scenario
Length (km)	208	257	257
Toll rates (INR)	1,530	160	540
Time (hrs)	5.20	8.86	8.00

Costs for MAV	Current scenario Alternative 1 via Asset route	Current scenario Alternative 2 via Tharad	Post-upgrade scenario
GJC	11,366	14,978	14,276
AADT FY21	4,167		
Total in-scope traffic	1,100		

Source: Steer analysis of Client data, benchmarks, TMS data and publicly available information

- 5.12 As we can see from the table above the Alt 2 is longer by 50km, however the toll costs are almost INR 1000/- higher for truckers using Alt 1. Therefore, based on the above GJC analysis, we expect that Alt1 can loose upto 30% of the in-scope traffic. The resultant impact on total traffic considered for this upgrade is presented in the table below on the Asset staged from FY22 to FY24.

**Table 5.4: Estimated impacts on A1 and A2 due to Udaipur-Sirohi-Tharad upgrade**

Vehicle type	FY22	FY23	FY24
Staging	50%	75%	100%
<b>A1 TP1 Khemana</b>			
3A	(1.8%)	(2.7%)	(3.6%)
MAV	(4.2%)	(6.3%)	(8.4%)
<b>A2 TP1 Undavariya</b>			
3A	(1.9%)	(2.8%)	(3.8%)
MAV	(3.6%)	(5.5%)	(7.3%)

Source: Steer analysis

#### *Completion of Western Dedicated Freight Corridor (WDFC)*

- 5.13 The Western Dedicated Freight Corridor (WDFC) is a 1506-km long dedicated freight rail line that connects Delhi (along with the wider Delhi NCR region) with Mumbai's JNPT port. This is expected to cater to north-south long-distance logistics, causing road-rail diversion especially of heavy vehicles that carry export-import (EXIM) goods and/or bulk commodities.
- 5.14 As of September 2020, 98.3% land acquisition was complete. More than 300-km of track has been completed from Rewari to Madar. The 306-km New Rewari-New Madar section of the Western Dedicated Freight Corridor was flagged off in Jan 2021. This was a 1.5-km-long electrified double stack long haul container train. We expect the fuller long-distance impact of the WDFC to be effective FY23 (50%) and FY24 (100%).

**Table 5.5: Status of WDFC sections**

Sections	Length (km)	Status – expected year of completion
Rewari-Palanpur	641	Rewari-Madar (commissioned 603 trains) Madar-Palanpur (Mar FY21)
Palanpur-Makarpura	289	March FY22
Makarpura-Sachin	135	June FY23
Sachin-Vaitarna	186	June FY23
Vaitarna-JNPT	101	June FY23

Sections	Length (km)	Status – expected year of completion
Dadri-Rewari	127	Mar FY22

Source: Steer research

5.15 To estimate the loss of trucks on the Asset due to WDFC, we identified the in-scope traffic which was estimated using the following parameters:

- Commercial vehicles that carry the following commodities:
  - POL, Coal, Containers that are bulk in nature.
- Vehicles that commute between regions north of the Asset, which are located along the alignment of the WDFC like Delhi, Haryana and travelling long-distance covering more than 750 km.

5.16 These commodities on the Assets 1 and 2 form up to 15% of the total 3A/MAV traffic. We have assumed up-to one-third of the in-scope traffic to shift towards DFC. Below tables presents our assumptions for the same.

**Table 5.6: Estimated impacts on A1 and A2 due to completion of WDFC**

Vehicle type	FY23	FY24	FY25 onwards
Staging	50%	75%	100%
<b>A1 TP1 Khemana</b>			
3A	(2.5%)	(3.8%)	(5.0%)
MAV	(2.5%)	(3.8%)	(5.0%)
<b>A2 TP1 Undavariya</b>			
3A	(2.5%)	(3.8%)	(5.0%)
MAV	(2.5%)	(3.8%)	(5.0%)

Source: Steer analysis of Client OD data, TMS data and publicly available information

#### *LOS improvement*

5.17 The Assets are likely to undergo 6-laning once the design capacity is breached. In our analysis, we have assumed that the Assets will begin construction activities for 6-laning once the traffic exceeds 40,000 PCUs for four consecutive years. For DPR preparation it would take another two years which will be followed by the construction activity, which expected to last another two years.

5.18 Therefore, we have estimated that the first two years of construction would cause a negative impact on the local traffic due to reduced speeds on the Asset and increased time, while on completion of 6-laning the improved LOS will induce more traffic on the Asset.

5.19 A comparison of generalised journey costs (GJC) provides how different elements of cost and time affect traffic. This comparison was done for both light and heavy vehicles. Lower GJCs correspond to higher induced traffic. Based on Steer's studies and research in India, we have found that for every 1% reduction in the GJCs, the traffic increases by a factor of 0.3. We then applied the difference of GJCs to the elasticity of 0.3 to get net influence on the traffic.

5.20 The improvement in travel costs or GJC is translated into the impact on that share of OD movements using a linear inverse relationship. Therefore, the GJC influence is applied on the



corresponding shares of traffic, which were extracted from OD data. In this case, we have adopted the OD data provided by the client.

- 5.21 The table below shows the extent of the LOS impact and the expected timelines of the impact on each of the Assets.

**Table 5.7: Estimated impacts on A1 and A2 due to LOS improvement**

Vehicle type	FY33	FY34	FY35 onwards
<b>A1 TP1 Khemana</b>			
CJV	-	-	2.5%
LCV	-	-	2.5%
Bus	-	-	-
2A	(0.3%)	(0.3%)	0.5%
3A	(0.3%)	(0.3%)	0.5%
MAV	(1.3%)	(1.3%)	2.1%
Vehicle type	FY31	FY32	FY33 onwards
<b>A2 TP1 Undavariya</b>			
CJV			2.5%
LCV			2.5%
Bus			-
2A	(0.3%)	(0.3%)	0.5%
3A	(0.3%)	(0.3%)	0.5%
MAV	(1.3%)	(1.3%)	2.1%

Source: Steer analysis of Client OD data, TMS data and publicly available information

### ***Asset 3 Belgaum-Kagal***

#### ***Development of alternate corridors between Mumbai- South India***

- 5.22 The long-distance Mumbai-South India, as shown in Figure 5.2, trip demand can be split into two major markets that comprise the Mumbai-Chennai and Mumbai-Bangalore markets.
- 5.23 These have three major route options:
- NH48 via Satara-Kolhapur-Hubli (Asset route)
  - NH52-NH50 via Solapur-Vijayapura-Hosapet (Alternate route 1)
  - NH65 via Hyderabad
    - Via Kurnool/Kadapa (Alternate route 2)
    - Via Nalgonda/Ongole (Alternate route 3)
- 5.24 The table below shows the various network upgrades being carried out or being planned in the short-to-medium-term on the Mumbai-Pune-Bangalore-Chennai corridor network.

**Table 5.8: Network development and status on the Mumbai-Bangalore-Chennai corridor network**

Corridor	Route	Network development	Year of completion
NH48	Pune-Dharwad-Chitradurga-Bangalore- Chennai	Six-laning of Hubli-Chitradurga	FY22

Corridor	Route	Network development	Year of completion
NH52-NH50	Pune-Bijapur-Chitradurga-Bangalore-Chennai	Four-laning of Solapur-Bijapur	FY22
		Four-laning of Hosapete-Chitradurga	FY22
NH65-NH44-NH40	Mumbai-Solapur-Hyderabad-Kurnool-Chennai	Four-laning of Solapur-Humnabad	FY24
NH65-NH565	Mumbai-Solapur-Hyderabad-Ongole-Chennai	Four-laning of Solapur-Humnabad	FY24

Source: Steer research

5.25 The map below shows the road network surrounding the Asset.

Figure 5.2: Alternate routes and Asset route shown against the regional network context on Asset 3



Source: Steer analysis and cartography

- 5.26 Due to the network upgrades discussed, we expect an overall negative impact on the Asset route. For the Pune-Bangalore traffic market, the six-laning (Hubli-Chitradurg section) on the Asset route and four-laning (Solapur-Bijapur and Hosapete-Chitradurg sections) on the Alternate route 1 are expected to cause a negative diversion to the latter route. For the Pune-Chennai traffic market, the six-laning on the Asset route and four-laning of Solapur-Humnabad is expected to result in a negative diversion on to the Alternate routes 2 and 3. Overall, the completion of the Pune Ring Road, is expected to provide an easier connection to traffic heading in the direction of Solapur or beyond.
- 5.27 Further, as discussed in chapter 3, the Asset will, as per client inputs, undergo 6-Laning starting FY23. We expect that during the construction phase the level of diversion of the in-scope traffic to the alternate routes will be higher than in an As-Is scenario. However, we believe that once the 6-Laning is complete we expect some of the traffic lost to the alternates to return back to the Asset, essentially due to the stickiness of the traffic and well-defined route choices. Similar behaviour of traffic has been observed on other Assets where 6-laning has happened, that during the construction period the proportion of traffic lost returned back to asset post construction completion. Hence it is reasonable to assume that similar behaviour will be exhibited by the long distance traffic on this corridor as well.

**Table 5.9: Estimated network development impacts on Pune-Bangalore traffic market on A3 – Bangalore market**

Vehicle type	FY23	FY24	FY25 onwards
<b>A3 TP1 Kognoli</b>			
2A	(3.3%)	(3.3%)	(2.6%)
3A	(8.1%)	(8.1%)	(6.0%)
MAV	(9.4%)	(9.4%)	(5.5%)
<b>A3 TP2 Hattargi</b>			
2A	(3.3%)	(3.3%)	(2.6%)
3A	(8.1%)	(8.1%)	(6.0%)
MAV	(9.4%)	(9.4%)	(5.5%)

Source: Steer analysis of Client OD data, TMS data and publicly available information, Higher diversion percentages are estimated during the construction period in FY23, FY24

**Table 5.10: Estimated network development impacts on Pune-Bangalore traffic market on A3– Chennai market**

Vehicle type	FY24	FY25	FY26 onwards
<b>A3 TP1 Kognoli</b>			
2A	(0.2%)	(0.4%)	(0.7%)
3A	(0.4%)	(0.9%)	(1.8%)
MAV	(0.6%)	(1.1%)	(2.2%)
<b>A3 TP2 Hattargi</b>			
2A	(0.2%)	(0.4%)	(0.7%)
3A	(0.4%)	(0.9%)	(1.8%)
MAV	(0.6%)	(1.1%)	(2.2%)

Source: Steer analysis

### LOS improvement

- 5.28 As discussed earlier, the 6 laning of this Asset will be undertaken starting FY23 for a period of two years. The construction activity is likely to cause some suppression in the local traffic for the first two years, but 6-laning completion will improve the LOS of the Asset and induce additional traffic.
- 5.29 The table below shows the estimated impact and the expected timeline of the impact on each of the toll plazas.

**Table 5.11: Estimated impacts on A3 due to LOS improvement**

Vehicle type	FY23	FY24	FY25 onwards
<b>A3 TP1 Kognoli</b>			
CJV	-	-	1.8%
LCV	-	-	1.8%
Bus	-	-	-
2A	(1.6%)	(1.6%)	2.3%
3A	(1.6%)	(1.6%)	2.3%
MAV	(1.0%)	(1.0%)	1.1%
Vehicle type	FY23	FY24	FY25 onwards
<b>A3 TP2 Hattargi</b>			
CJV			1.8%
LCV			1.8%
Bus			-
2A	(1.6%)	(1.6%)	2.3%
3A	(1.6%)	(1.6%)	2.3%
MAV	(1.0%)	(1.0%)	1.1%

Source: Steer analysis of Client OD data, TMS data and publicly available information

### Revenue forecasting assumptions

- 5.30 To forecast the revenues for a forecast year, the traffic forecast for each vehicle type is converted into tickets sold, which is then multiplied with the corresponding toll rate. While toll segmentation provides the breakup of trips paying each ticket type, trip factors provide the conversion factor to convert from traffic (trips) to tickets sold. This section discusses assumptions related to toll segmentation, trip factors and toll rates for the forecast period.

#### Toll evolution for Assets 1-2 and Asset 3

- 5.31 Based on the concession agreement and the gazetted toll notification, we see that base toll rates increase every year based on WPI-linked inflation to provide us unrounded toll rates. These are rounded up to the nearest five to estimate the rounded toll rates charged to the road user. The upward trend in inflation is expected to resume in FY23 at 6.0% before falling to 4.3% in FY25 and further decrease to 3.5% gradually by FY50.

**Table 5.12: WPI growth forecast assumptions**

Financial year	WPI growth (%)	Financial year	WPI growth (%)
<b>FY21</b>		<b>FY36</b>	3.8%
<b>FY22</b>	1.2%	<b>FY37</b>	3.7%
<b>FY23</b>	6.0%	<b>FY38</b>	3.8%
<b>FY24</b>	4.3%	<b>FY39</b>	3.8%
<b>FY25</b>	4.4%	<b>FY40</b>	3.8%
<b>FY26</b>	5.0%	<b>FY41</b>	3.8%
<b>FY27</b>	4.5%	<b>FY42</b>	3.8%
<b>FY28</b>	4.4%	<b>FY43</b>	3.8%
<b>FY29</b>	4.2%	<b>FY44</b>	3.8%
<b>FY30</b>	4.2%	<b>FY45</b>	3.8%
<b>FY31</b>	3.9%	<b>FY46</b>	3.8%
<b>FY32</b>	3.8%	<b>FY47</b>	3.7%
<b>FY33</b>	3.9%	<b>FY48</b>	3.7%
<b>FY34</b>	4.0%	<b>FY49</b>	3.6%
<b>FY35</b>	3.9%	<b>FY50</b>	3.5%

Source: WPI assumptions based on publicly available information

- 5.32 The table below gives an overview of toll estimation methodology.

**Table 5.13: Toll estimation overview**

Toll fee escalation	Revision date	Nearest rounding
Linked to 40% WPI increase and a fixed increase of 3% every year	April	5

Source: Toll notification

### **Toll segmentation and trip factors for Asset 1-2 and Asset 3**

#### *Toll segmentation*

- 5.33 The base-year toll segmentation was presented in Chapter 3. Earlier in chapter 3, we had also discussed the differences between the Schedule-M data and the Steer AADT estimate (normalised and SCF-adjusted DPR data). This difference is attributable to forced exemptions (not part of the toll notification-allowed exemptions) and violations on the Asset. For the base year, we had assumed this difference to add to the existing share of exemptions and violations category.
- 5.34 As discussed above the that there is a level of underreporting or non-paying traffic that exists on the Asset. It is expected that once the toll plaza is operated professionally and improvement in reporting of traffic is ensure, Schedule-M levels of reported traffic segmentation will be achieved. Therefore, we have assumed that these unreported forced



exemptions and violations will return to the reported Schedule M levels by FY23, as seen in the examples of CJV and MAV shown below.

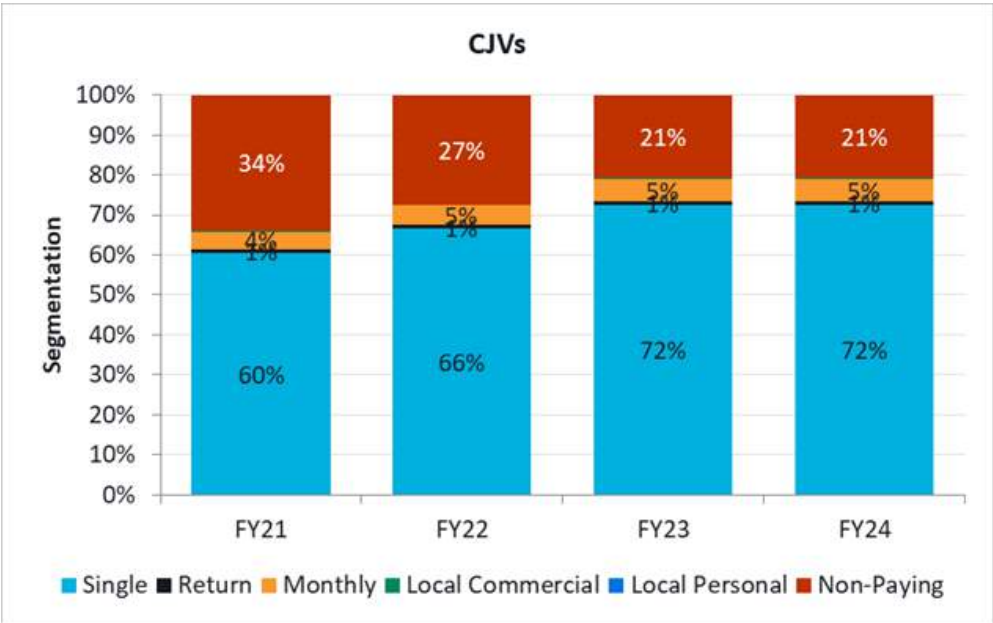
**Table 5.14: Toll segmentation for the forecast year FY23**

Forecast	CJV	LCV/Mini-bus	Bus	2A	3A	MAV	OSV
<b>Asset 1 TP1 Khemana</b>							
Single	72.5%	87.4%	91.2%	91.2%	88.9%	97.5%	86.6%
Return	1.1%	4.1%	5.1%	5.1%	3.6%	1.2%	7.4%
Monthly	5.3%	-	0.2%	0.2%	-	-	-
Local Commercial	0.3%	1.7%	1.5%	1.5%	1.8%	0.4%	3.1%
Exemptions & violations	20.9%	6.8%	2.0%	2.0%	5.7%	0.9%	2.8%
<b>Asset 2 TP1 Undavariya</b>							
Single	87.8%	95.8%	98.7%	98.7%	99.2%	99.0%	95.8%
Return	-	-	-	-	-	-	-
Monthly	5.3%	-	0.3%	0.3%	-	0.1%	-
Local Commercial	-	-	-	-	-	-	-
Exemptions & violations	6.9%	4.2%	0.9%	0.9%	0.8%	0.9%	4.2%
<b>Asset 3 TP1 Kognoli</b>							
Single	71.2%	78.3%	83.9%	83.9%	96.9%	98.3%	99.9%
Return	21.8%	16.5%	6.3%	6.3%	2.6%	1.5%	0.1%
Monthly	-	-	-	-	-	-	-
Local Commercial	0.0%	3.4%	8.4%	8.4%	0.1%	0.0%	-
Exemptions & violations	7.0%	1.8%	1.4%	1.4%	0.3%	0.1%	-
<b>Asset 3 TP2 Hattargi</b>							
Single	62.4%	63.3%	73.3%	73.3%	86.9%	90.7%	92.4%
Return	31.4%	19.1%	11.2%	11.2%	7.1%	4.3%	5.4%
Monthly	0.3%	-	0.0%	0.0%	-	-	-
Local Commercial	0.8%	13.1%	14.6%	14.6%	5.4%	5.0%	-
Exemptions & violations	5.0%	4.5%	0.9%	0.9%	0.6%	0.1%	2.3%

Source: Steer analysis of Client TMS data

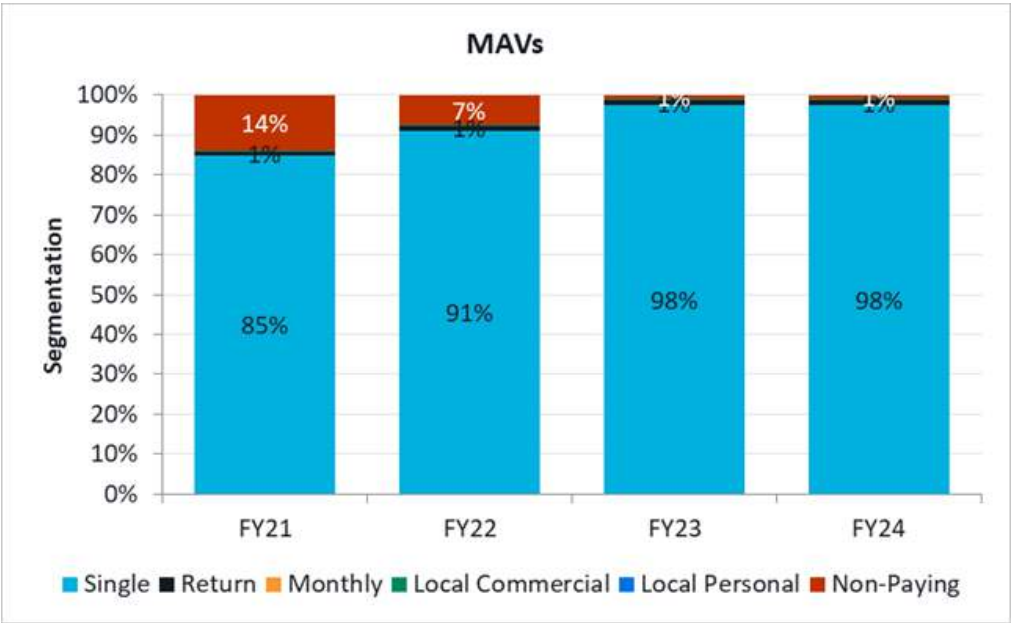
- 5.35 Further, the figures below illustrate the evolution of the toll segmentation for two example toll categories – CJV and MAV. Non-paying (exemptions and violations) for CJV are expected to return to Schedule-M levels starting FY23.

Figure 5.3: Evolution of CJV toll segmentation in the short term, A1 TP1 Khemana



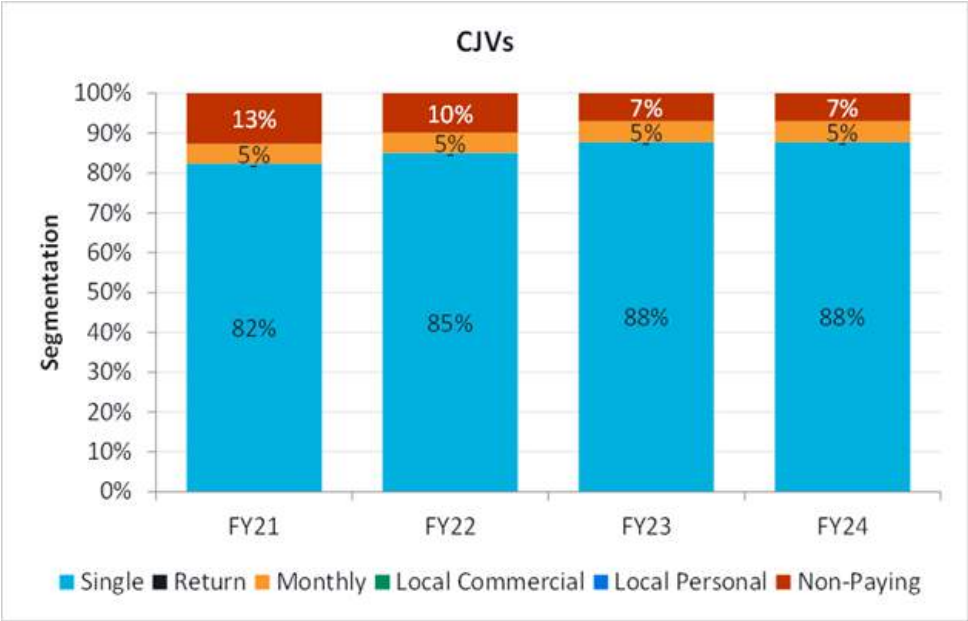
Source: Steer analysis

Figure 5.4: Evolution of MAV toll segmentation in the short term, A1 TP1 Khemana



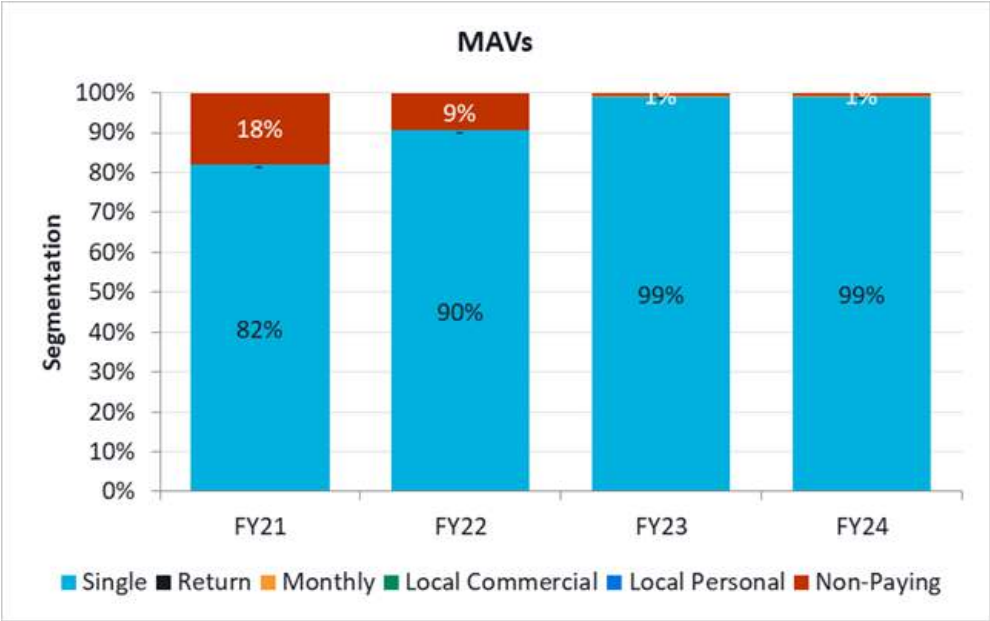
Source: Steer analysis

Figure 5.5: Evolution of CJV toll segmentation in the short term, A2 TP1 Undavariya



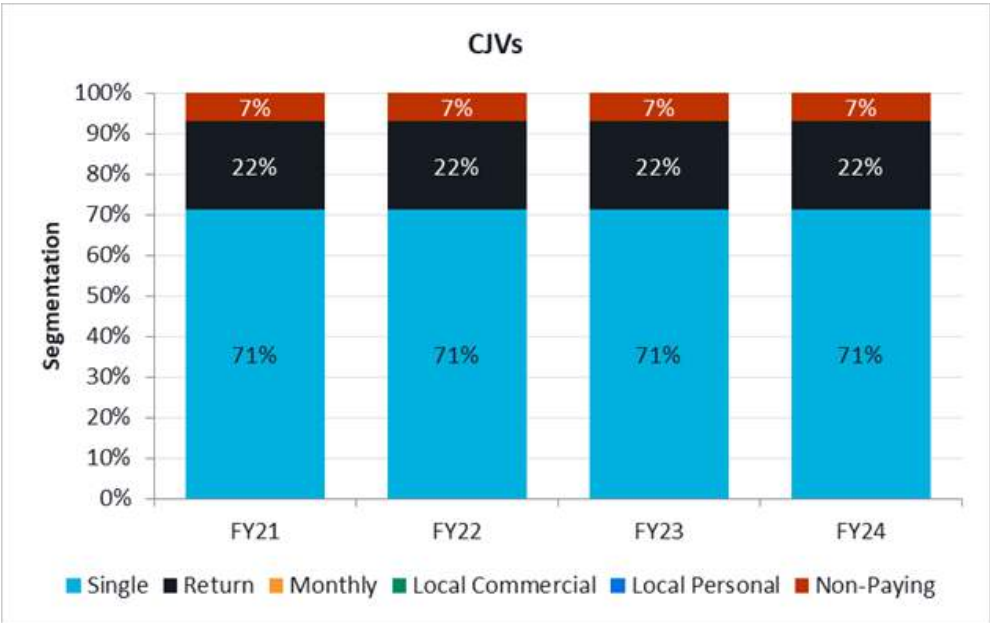
Source: Steer analysis

Figure 5.6: Evolution of MAV toll segmentation in the short term, A2 TP1 Undavariya



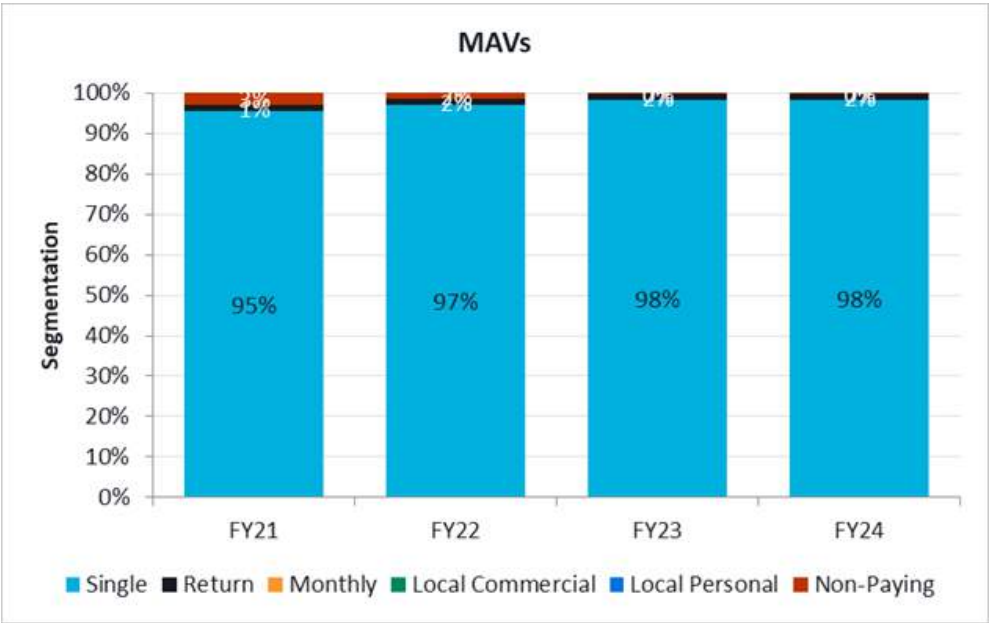
Source: Steer analysis

Figure 5.7: Evolution of CJV toll segmentation in the short term, A3 TP1 Kognoli



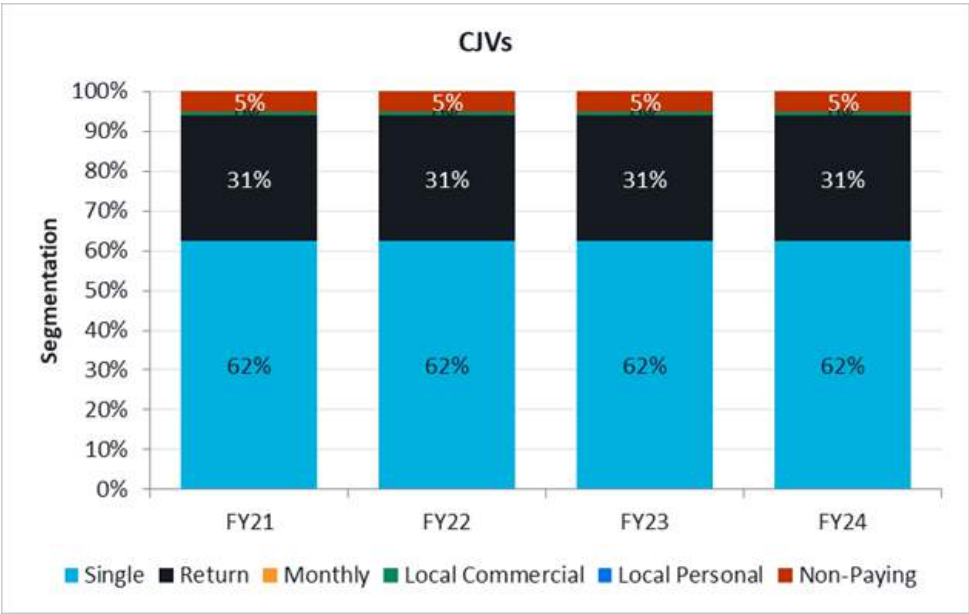
Source: Steer analysis

Figure 5.8: Evolution of MAV toll segmentation in the short term, A3 TP1 Kognoli



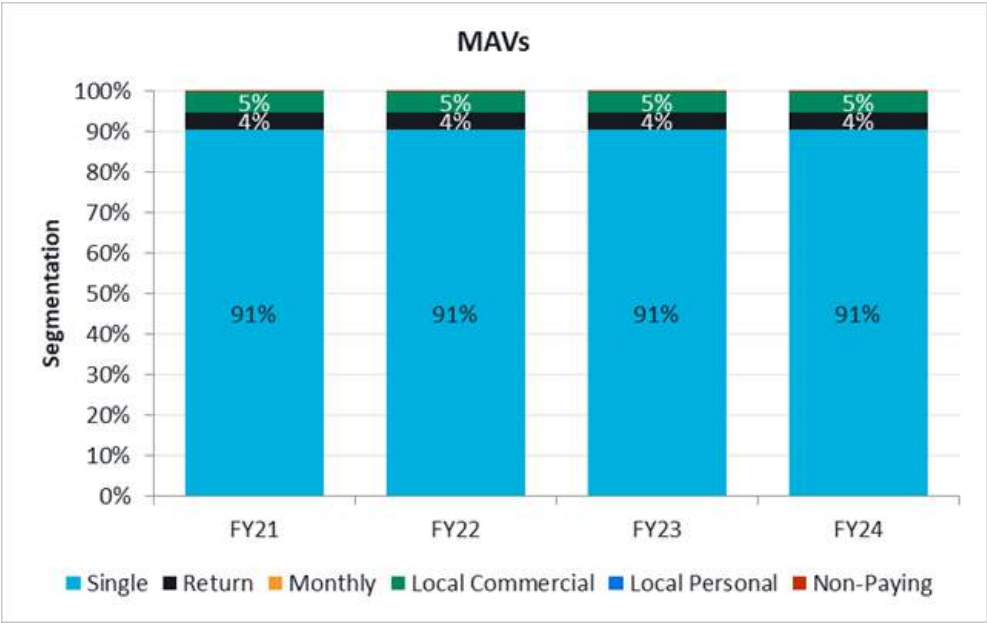
Source: Steer analysis

Figure 5.9: Evolution of CJV toll segmentation in the short term, A3 TP2 Hattargi



Source: Steer analysis

Figure 5.10: Evolution of MAV toll segmentation in the short term, A3 TP2 Hattargi



Source: Steer analysis

*Trip factors*

5.36 As for trip factors, since the onset of fast-tag , the trip factors have stabilised to the assumed levels of 1, 2 and 45 for Single, Return and Monthly categories, respectively, as now the user only pays toll for the trip that has been actually made, hence there will be no unused return tickets.



- 5.37 There is no major toll category being charged, apart from the official list of toll categories in the toll notification. This assumes that further changes in toll categories, unless specific discounts are offered, are unlikely.

### Traffic and Revenue forecasts

- 5.38 Based on the traffic and revenue-related forecast assumptions discussed above, we have modelled the traffic and revenue forecasts for the forecast period for the Asset. The table below presents the AADT/PCU forecast growth rates and CAGRs on this Asset for the operational toll plazas.

#### Base Case

**Table 5.15: Traffic forecast, A1 TP1 Khemana**

Khemana	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	6,216	6,737	9,821	13,626	18,708	24,292	30,703	34,920
LCV	347	360	429	499	586	660	736	781
Bus	360	374	445	518	593	669	745	791
2 Axle	761	778	865	948	1,033	1,110	1,185	1,228
3 Axle	1,033	1,041	1,095	1,224	1,363	1,498	1,634	1,717
MAV	4,402	4,473	5,295	6,786	8,723	10,755	13,054	14,564
Total	13,416	14,073	18,318	24,030	31,508	39,551	48,688	54,670
PCU	33,318	34,312	41,896	53,435	68,336	84,111	101,909	113,542

Source: Steer analysis

**Table 5.16: Traffic growth rates (%), A1 TP1 Khemana**

Khemana	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	7.8%	6.8%	6.5%	5.4%	4.8%	6.1%
LCV	3.6%	3.1%	3.2%	2.4%	2.2%	2.8%
Bus	3.6%	3.1%	2.7%	2.4%	2.2%	2.7%
2 Axle	2.1%	1.8%	1.7%	1.5%	1.3%	1.6%
3 Axle	1.0%	2.3%	2.2%	1.9%	1.8%	1.8%
MAV	3.4%	5.1%	5.1%	4.3%	4.0%	4.3%
Total	5.4%	5.6%	5.6%	4.7%	4.2%	5.0%
PCU	4.1%	5.0%	5.0%	4.2%	3.9%	4.4%

Source: Steer analysis

**Table 5.17: Revenue (INR crore), A1 TP1 Khemana**

Khemana	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	8.8	11.3	13.4	15.6	16.8	30.5	54.2	87.0	134.6	207.0
LCV	1.2	1.2	1.3	1.4	1.5	2.3	3.3	4.7	6.5	8.9
Bus	2.6	2.8	3.1	3.3	3.6	5.3	7.5	10.5	14.5	19.8

2A	5.5	5.9	6.3	6.7	7.1	9.9	13.3	17.8	23.5	30.7
3A	6.8	7.5	8.5	8.9	9.3	13.3	18.4	24.9	33.9	45.2
MAV	44.8	50.4	56.7	61.2	66.1	107.6	171.0	263.0	396.4	587.2
Total	69.5	79.1	89.3	97.2	104.5	168.9	267.7	408.0	609.4	898.8

Source: Steer analysis

**Table 5.18: Traffic forecast, A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	5,490	5,951	8,675	12,035	16,524	21,456	27,119	30,844
LCV	414	430	512	596	699	788	878	932
Bus	487	506	602	701	802	905	1,008	1,069
2 Axle	705	721	801	876	957	1,029	1,098	1,138
3 Axle	975	982	1,031	1,150	1,284	1,411	1,539	1,617
MAV	5,058	5,169	6,161	7,784	10,147	12,511	15,185	16,942
Total	13,555	14,201	18,309	23,753	31,131	38,910	47,729	53,498
PCU	35,834	36,961	45,041	56,797	73,138	89,847	108,678	120,985

Source: Steer analysis

**Table 5.19: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya**

Undavariya	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	7.8%	6.8%	6.5%	5.4%	4.8%	6.1%
LCV	3.6%	3.1%	3.2%	2.4%	2.2%	2.8%
Bus	3.6%	3.1%	2.7%	2.4%	2.2%	2.7%
2 Axle	2.1%	1.8%	1.8%	1.5%	1.3%	1.6%
3 Axle	1.0%	2.2%	2.2%	1.9%	1.8%	1.8%
MAV	3.6%	4.8%	5.4%	4.3%	4.0%	4.3%
Total	5.2%	5.3%	5.6%	4.6%	4.2%	4.9%
PCU	4.0%	4.7%	5.2%	4.2%	3.9%	4.3%

Source: Steer analysis

**Table 5.20: Revenue (INR Crore), A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	6.9	7.7	8.7	10.5	11.3	21.3	34.6	58.5	91.2	139.3
LCV	0.9	1.0	1.1	1.1	1.3	1.9	2.7	3.8	5.2	7.0
Bus	2.3	2.5	2.8	3.0	3.2	4.7	6.7	9.4	12.9	17.6
2A	3.3	3.5	3.9	4.1	4.3	6.0	8.2	10.9	14.3	18.7
3A	4.2	4.9	5.5	5.8	6.1	8.6	11.8	16.0	21.8	29.0

MAV	31.0	36.7	42.5	45.4	49.2	80.4	127.7	196.5	295.3	438.2
Total	48.7	56.3	64.3	70.0	75.3	122.8	191.7	295.2	440.7	649.8

Source: Steer analysis

**Table 5.21: Traffic forecast, A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	9,060	9,580	13,082	17,340	22,347	28,130	34,792	39,230
LCV	2,066	2,125	2,464	2,764	3,063	3,363	3,665	3,848
Bus	778	795	877	956	1,033	1,108	1,182	1,226
2 Axle	1,164	1,189	1,298	1,415	1,529	1,640	1,750	1,815
3 Axle	1,027	1,062	1,168	1,343	1,526	1,716	1,912	2,033
MAV	1,628	1,716	2,036	2,540	3,111	3,749	4,455	4,912
Total	16,694	17,465	22,081	27,651	34,041	41,277	49,468	54,860
PCU	29,391	30,651	37,156	45,384	54,673	65,050	76,628	84,170

Source: Steer analysis

**Table 5.22: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli**

Kognoli	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	6.4%	5.8%	5.2%	4.7%	4.3%	5.2%
LCV	3.0%	2.3%	2.1%	1.9%	1.7%	2.1%
Bus	2.0%	1.7%	1.6%	1.4%	1.3%	1.6%
2 Axle	1.8%	1.7%	1.6%	1.4%	1.3%	1.5%
3 Axle	1.9%	2.8%	2.6%	2.4%	2.2%	2.3%
MAV	3.5%	4.5%	4.1%	3.8%	3.5%	3.8%
Total	4.8%	4.6%	4.2%	3.9%	3.7%	4.2%
PCU	3.9%	4.1%	3.8%	3.5%	3.3%	3.7%

Source: Steer analysis

**Table 5.23: Revenue (INR Crore), A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	21.6	22.9	19.4	20.9	40.6	67.2	109.6	169.2	261.2	394.5
LCV	7.3	8.2	7.0	7.6	13.8	19.6	26.8	36.7	49.6	66.1
Bus	6.1	6.7	5.5	5.9	10.5	14.4	19.4	25.6	33.8	44.2
2A	9.1	10.0	7.8	8.4	15.5	21.3	28.7	37.9	50.0	65.5
3A	9.9	10.5	7.9	8.5	16.1	23.0	32.5	45.4	62.6	85.2
MAV	22.1	24.3	18.5	20.3	39.2	60.9	92.9	139.6	204.9	297.9
Total	76.1	82.4	66.1	71.5	135.6	206.5	309.9	454.5	662.0	953.3

Source: Steer analysis

**Table 5.24: Traffic forecast, A3 TP2 Hattargi**

Hattargi	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	8,525	9,015	12,310	16,317	21,028	26,470	32,739	36,916
LCV	2,246	2,310	2,679	3,004	3,330	3,655	3,984	4,182
Bus	858	876	966	1,053	1,138	1,221	1,303	1,351
2 Axle	2,051	2,095	2,287	2,493	2,693	2,889	3,082	3,197
3 Axle	1,217	1,258	1,383	1,590	1,807	2,032	2,265	2,408
MAV	1,690	1,781	2,113	2,637	3,229	3,891	4,624	5,098
Total	17,810	18,593	23,196	28,724	35,031	42,139	50,153	55,414
PCU	33,144	34,486	41,259	49,788	59,341	69,945	81,711	89,345

Source: Steer analysis

**Table 5.25: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi**

Hattargi	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	6.4%	5.8%	5.2%	4.7%	4.3%	5.2%
LCV	3.0%	2.3%	2.1%	1.9%	1.7%	2.1%
Bus	2.0%	1.7%	1.6%	1.4%	1.3%	1.6%
2 Axle	1.8%	1.7%	1.6%	1.4%	1.3%	1.5%
3 Axle	1.9%	2.8%	2.6%	2.4%	2.2%	2.3%
MAV	3.5%	4.5%	4.1%	3.8%	3.5%	3.8%
Total	4.5%	4.4%	4.0%	3.8%	3.5%	4.0%
PCU	3.7%	3.8%	3.6%	3.3%	3.2%	3.5%

Source: Steer analysis

**Table 5.26: Revenue (INR Crore), A3 TP2 Hattargi**

Hattargi	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	8.1	8.5	7.4	8.2	19.2	32.4	53.7	83.7	128.1	192.0
LCV	3.2	3.2	2.9	3.0	7.0	10.1	13.8	18.9	25.5	34.0
Bus	2.7	2.8	2.3	2.5	5.7	7.9	10.6	14.1	18.6	24.3
2A	6.4	6.8	5.3	5.7	13.6	18.8	25.1	33.5	43.9	57.6
3A	4.4	4.8	3.4	3.8	9.6	13.6	19.3	27.0	36.9	50.5
MAV	8.9	9.7	7.4	8.0	20.6	31.9	48.8	73.3	107.2	156.0
Total	33.6	35.9	28.7	31.1	75.7	114.7	171.3	250.5	360.2	514.3

Source: Steer analysis

## Upside and Downside scenario assumptions

- 5.39 We have developed our base case scenario considering a balanced view on the risks associated with input assumptions around GDP growth and traffic growth elasticities. There is always a risk that the outturn values of these inputs will vary as compared to the assumptions taken due to exogenous impacts, e.g. GDP growth could be influenced both positively and negatively by the impact of monsoons, export-import balances, political changes etc.
- 5.40 Similarly, traffic growth elasticities could be influenced by increased efficiencies achieved by technology, large shifts in commodity prices globally, changes in local manufacturing practices. However, at this stage we consider that the base case represents a central case scenario given the risks of variation of input assumptions.
- 5.41 To account for the possible variations in the growth drivers, we are also presenting the forecasts for an Upside (optimistic) and a Downside (pessimistic) scenario. These scenarios are defined by the following variations from the base assumptions:

**Table 5.27: Summary of upside and downside assumptions**

Asset	Input	Base	Upside	Downside
<b>Macro Assumptions</b>				
All assets	GDP/GSDP	As provided in report	+1% every year	-1% every year
All assets	WPI	As provided in report	+1% every year	-1% every year
All assets	Elasticities	As provided in report	Incremental 10%	Decremental 10%
All assets	GDP variation and elasticity factor for FY22	GDP as provided in report, 0.7 elasticity factor	+2.5% GDP, 0.9 elasticity factor	-2.5% GDP, 0.5 elasticity factor
<b>Impacts</b>				
Palanpur assets	WDFC	FY23-FY25 -5% on 3A-MAV	FY25-FY27 -2.5% on 3A-MAV	FY22-FY24 -10% on 3A-MAV
	Sirohi-Tharad upgrade	FY22-FY24 -4% on 3A -8% on MAV	FY22-FY24 -2% on 3A -4% on MAV	FY22-FY24 -6% on 3A -10% on MAV
	6 laning of assets	FY34 0.5% to 2.5%	Calculated year of 6 laning 0.5% to 2.5%	Calculated year of 6 laning 0.5% to 2.5%
Kagal-Belgaum	Diversion to NH50 (Bangalore)	FY25-FY27 -2.6% on 2A -5.5% on 3A – MAV	FY27-FY29 -1.3% on 2A -2.75% on 3A – MAV	FY23-FY25 -2.6% on 2A -5.5% on 3A – MAV
	Diversion to NH40-NH16 (Chennai)	FY24-FY26 -0.7% on 2A -2% on 3A –MAV	FY26-FY28 -1% on 3A –MAV	FY22-FY24 -0.7% on 2A -2% on 3A – MAV



Asset	Input	Base	Upside	Downside
	6 laning of asset	FY25 1.8% to 2.3%	Calculated year of 6 laning 1.8% to 2.3%	Calculated year of 6 laning 1.8% to 2.3%

Source: Steer analysis

- 5.42 The traffic forecast and growth, and revenue incorporating the upside and downside assumptions are presented in the following sections.

### Upside Case

**Table 5.28: Traffic forecast, A1 TP1 Khemana**

Khemana	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	6,216	7,122	11,379	17,664	25,755	36,308	49,711	59,258
LCV	347	370	460	572	681	799	924	1,002
Bus	360	384	478	580	690	809	936	1,015
2 Axle	761	791	903	1,019	1,133	1,247	1,361	1,429
3 Axle	1,033	1,072	1,209	1,404	1,605	1,819	2,045	2,186
MAV	4,402	4,774	6,406	9,008	12,117	15,985	20,729	24,049
Total	13,416	14,832	21,230	30,738	42,566	57,652	76,498	89,800
PCU	33,318	36,239	49,084	68,585	92,206	121,784	158,236	183,782

Source: Steer analysis

**Table 5.29: Traffic growth rates (%), A1 TP1 Khemana**

Khemana	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	9.8%	9.2%	7.8%	7.1%	6.5%	7.9%
LCV	4.5%	4.4%	3.6%	3.2%	2.9%	3.6%
Bus	4.5%	3.9%	3.6%	3.2%	2.9%	3.5%
2 Axle	2.7%	2.5%	2.1%	1.9%	1.8%	2.1%
3 Axle	2.4%	3.0%	2.7%	2.5%	2.4%	2.6%
MAV	6.1%	7.1%	6.1%	5.7%	5.3%	5.9%
Total	7.4%	7.7%	6.7%	6.3%	5.8%	6.6%
PCU	6.3%	6.9%	6.1%	5.7%	5.4%	6.0%

Source: Steer analysis

**Table 5.30: Revenue (INR crore), A1 TP1 Khemana**

Khemana	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	9	12	14	17	20	29	78	144	254	443
LCV	1	1	1	2	2	2	4	6	10	14

Bus	3	3	3	4	4	5	9	14	22	32
2A	5	6	6	7	8	8	16	23	32	45
3A	7	8	9	10	11	12	23	34	50	72
MAV	45	54	65	73	81	106	254	435	731	1,212
Total	70	84	99	112	125	162	386	656	1,098	1,818

Source: Steer analysis

**Table 5.31: Traffic forecast, A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	5,490	6,291	10,051	15,602	22,748	32,070	43,908	52,341
LCV	414	442	550	683	814	954	1,103	1,196
Bus	487	520	646	784	934	1,094	1,266	1,373
2 Axle	705	733	836	944	1,049	1,155	1,261	1,324
3 Axle	975	1,012	1,140	1,324	1,514	1,715	1,928	2,062
MAV	5,058	5,502	7,405	10,411	14,004	18,474	23,956	27,794
Total	13,555	14,952	21,192	30,450	41,898	56,441	74,555	87,318
PCU	35,834	38,995	52,675	73,390	98,381	129,584	167,954	194,813

Source: Steer analysis

**Table 5.32: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya**

Undavariya	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	9.8%	9.2%	7.8%	7.1%	6.5%	7.9%
LCV	4.5%	4.4%	3.6%	3.2%	2.9%	3.6%
Bus	4.5%	3.9%	3.6%	3.2%	2.9%	3.5%
2 Axle	2.7%	2.5%	2.1%	1.9%	1.8%	2.1%
3 Axle	2.4%	3.0%	2.7%	2.5%	2.4%	2.6%
MAV	6.1%	7.1%	6.1%	5.7%	5.3%	6.0%
Total	7.2%	7.5%	6.6%	6.1%	5.7%	6.5%
PCU	6.2%	6.9%	6.0%	5.7%	5.3%	5.9%

Source: Steer analysis

**Table 5.33: Revenue (INR Crore), A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	7	8	10	12	13	20	53	94	169	298
LCV	1	1	1	1	1	2	3	5	8	11
Bus	2	3	3	3	3	4	8	13	19	28
2A	3	4	4	4	5	5	10	14	20	27

3A	4	5	6	6	7	8	15	22	32	46
MAV	31	39	48	54	59	79	189	325	544	900
Total	49	59	72	81	88	117	278	473	792	1,311

Source: Steer analysis

**Table 5.34: Traffic forecast, A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	9,060	9,975	14,692	21,070	29,311	39,750	52,888	62,264
LCV	2,066	2,170	2,604	3,017	3,452	3,908	4,390	4,691
Bus	778	808	914	1,022	1,130	1,241	1,354	1,424
2 Axle	1,164	1,208	1,381	1,543	1,707	1,874	2,045	2,150
3 Axle	1,027	1,089	1,306	1,555	1,838	2,148	2,486	2,702
MAV	1,628	1,784	2,367	3,128	4,075	5,216	6,576	7,508
Total	16,694	18,053	24,484	32,747	43,127	55,962	71,785	82,924
PCU	29,391	31,620	41,304	53,480	68,509	86,748	108,822	124,156

Source: Steer analysis

**Table 5.35: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli**

Kognoli	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37 – FY42	FY42 – FY50	FY22 – FY50
CJV	8.1%	7.5%	6.8%	6.3%	5.9%	6.8%
LCV	3.7%	3.0%	2.7%	2.5%	2.4%	2.8%
Bus	2.5%	2.2%	2.0%	1.9%	1.8%	2.0%
2 Axle	2.7%	2.2%	2.0%	1.9%	1.8%	2.1%
3 Axle	3.7%	3.6%	3.4%	3.2%	3.0%	3.3%
MAV	5.8%	5.7%	5.4%	5.1%	4.7%	5.3%
Total	6.3%	6.0%	5.7%	5.3%	5.1%	5.6%
PCU	5.5%	5.3%	5.1%	4.8%	4.6%	5.0%

Source: Steer analysis

**Table 5.36: Revenue (INR Crore), A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	22	24	21	24	44	85	152	266	461	785
LCV	7	8	8	8	15	22	33	48	70	100
Bus	6	7	6	6	11	16	23	33	46	64
2A	9	10	8	9	17	24	35	49	69	97
3A	10	11	8	9	19	28	42	64	96	142
MAV	22	26	20	22	46	77	131	216	353	570

Kognoli	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
Total	76	86	70	78	152	252	416	676	1,095	1,759

Source: Steer analysis

**Table 5.37: Traffic forecast, A3 TP2 Hattargi**

Hattargi	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	8,525	9,387	13,826	19,827	27,582	37,405	49,767	58,591
LCV	2,246	2,359	2,830	3,280	3,752	4,248	4,771	5,099
Bus	858	890	1,008	1,126	1,246	1,368	1,493	1,569
2 Axle	2,051	2,128	2,433	2,718	3,008	3,302	3,603	3,788
3 Axle	1,217	1,290	1,546	1,842	2,177	2,543	2,943	3,200
MAV	1,690	1,852	2,457	3,247	4,229	5,414	6,826	7,792
Total	17,810	19,191	25,637	33,818	44,026	56,578	71,980	82,790
PCU	33,144	35,517	45,681	58,259	73,641	92,164	114,433	129,831

Source: Steer analysis

**Table 5.38: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi**

Hattargi	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	8.1%	7.5%	6.8%	6.3%	5.9%	6.8%
LCV	3.7%	3.0%	2.7%	2.5%	2.4%	2.8%
Bus	2.5%	2.2%	2.0%	1.9%	1.8%	2.0%
2 Axle	2.7%	2.2%	2.0%	1.9%	1.8%	2.1%
3 Axle	3.7%	3.6%	3.4%	3.2%	3.0%	3.3%
MAV	5.8%	5.7%	5.4%	5.1%	4.7%	5.3%
Total	6.0%	5.7%	5.4%	5.1%	4.9%	5.4%
PCU	5.2%	5.0%	4.8%	4.6%	4.4%	4.7%

Source: Steer analysis

**Table 5.39: Revenue (INR Crore), A3 TP2 Hattargi**

Hattargi	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	8	9	8	9	22	41	73	131	225	381
LCV	3	3	3	3	8	11	17	25	36	52
Bus	3	3	2	3	6	9	13	18	25	35
2A	6	7	5	6	15	22	31	44	61	85
3A	4	5	4	4	11	16	25	38	57	84
MAV	9	10	8	9	24	40	68	113	185	299
Total	34	37	30	33	86	139	227	369	589	936

Source: Steer analysis

## Downside Case

**Table 5.40: Traffic forecast, A1 TP1 Khemana**

Khemana	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	6,216	6,474	8,686	11,139	13,833	17,114	20,157	21,998
LCV	347	354	405	454	502	561	604	629
Bus	360	367	420	471	521	568	612	637
2 Axle	761	769	835	895	947	1,005	1,052	1,077
3 Axle	1,033	964	968	1,052	1,130	1,219	1,295	1,339
MAV	4,402	4,067	4,424	5,324	6,187	7,491	8,577	9,246
Total	13,416	13,299	16,086	19,724	23,550	28,438	32,815	35,466
PCU	33,318	31,930	36,240	43,441	50,674	60,546	69,082	74,277

Source: Steer analysis

**Table 5.41: Traffic growth rates (%), A1 TP1 Khemana**

Khemana	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	6.1%	5.1%	4.4%	4.3%	3.3%	4.5%
LCV	2.8%	2.3%	2.0%	2.2%	1.5%	2.1%
Bus	2.8%	2.3%	2.0%	1.7%	1.5%	2.0%
2 Axle	1.6%	1.4%	1.2%	1.2%	0.9%	1.2%
3 Axle	0.1%	1.7%	1.4%	1.5%	1.2%	1.2%
MAV	1.7%	3.8%	3.1%	3.9%	2.7%	3.0%
Total	3.9%	4.2%	3.6%	3.8%	2.9%	3.6%
PCU	2.6%	3.7%	3.1%	3.6%	2.7%	3.1%

Source: Steer analysis

**Table 5.42: Revenue (INR crore), A1 TP1 Khemana**

Khemana	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	9	10	13	14	15	24	38	54	77	106
LCV	1	1	1	1	1	2	3	4	5	6
Bus	3	3	3	3	3	5	6	8	10	13
2A	5	6	6	6	7	9	11	14	18	22
3A	7	7	8	8	8	11	14	18	23	28
MAV	45	45	50	51	55	81	116	165	224	301
Total	70	72	81	84	90	132	188	263	357	476

Source: Steer analysis



**Table 5.43: Traffic forecast, A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	5,490	5,718	7,672	9,838	12,218	15,117	17,804	19,430
LCV	414	422	483	542	599	669	721	751
Bus	487	497	569	638	704	768	828	862
2 Axle	705	713	774	829	878	931	975	998
3 Axle	975	909	912	991	1,064	1,148	1,219	1,261
MAV	5,058	4,702	5,154	6,201	7,208	8,722	9,987	10,766
Total	13,555	13,395	16,060	19,595	23,286	28,042	32,275	34,839
PCU	35,834	34,337	38,887	46,529	54,156	64,655	73,694	79,199

Source: Steer analysis

**Table 5.44: Final (background plus impacts) traffic growth rates (%), A2 TP1 Undavariya**

Undavariya	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	6.1%	5.1%	4.4%	4.3%	3.3%	4.5%
LCV	2.8%	2.3%	2.0%	2.2%	1.5%	2.1%
Bus	2.8%	2.3%	2.0%	1.7%	1.5%	2.0%
2 Axle	1.6%	1.4%	1.2%	1.2%	0.9%	1.2%
3 Axle	0.0%	1.7%	1.4%	1.5%	1.2%	1.2%
MAV	1.8%	3.8%	3.1%	3.9%	2.7%	3.0%
Total	3.7%	4.1%	3.5%	3.8%	2.9%	3.5%
PCU	2.5%	3.7%	3.1%	3.6%	2.7%	3.0%

Source: Steer analysis

**Table 5.45: Revenue (INR Crore), A2 TP1 Undavariya**

Undavariya	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	7	7	8	10	10	16	19	38	50	71
LCV	1	1	1	1	1	2	2	3	4	5
Bus	2	2	3	3	3	4	4	7	9	12
2A	3	3	4	4	4	5	5	9	11	13
3A	4	4	5	5	5	7	7	12	15	18
MAV	31	33	37	38	41	61	65	124	168	224
Total	49	51	57	61	65	95	101	192	257	343

Source: Steer analysis

**Table 5.46: Traffic forecast, A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	9,060	9,313	11,881	14,676	17,671	20,825	24,152	26,218
LCV	2,066	2,095	2,356	2,567	2,767	2,956	3,139	3,244
Bus	778	787	848	904	957	1,005	1,052	1,078
2 Axle	1,164	1,174	1,255	1,338	1,416	1,488	1,557	1,596
3 Axle	1,027	1,039	1,107	1,227	1,347	1,465	1,580	1,647
MAV	1,628	1,660	1,870	2,205	2,556	2,921	3,295	3,523
Total	16,694	17,051	20,420	24,119	28,008	32,044	36,241	38,823
PCU	29,391	29,936	34,590	40,090	45,812	51,699	57,758	61,458

Source: Steer analysis

**Table 5.47: Final (background plus impacts) traffic growth rates (%), A3 TP1 Kognoli**

Kognoli	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	5.0%	4.3%	3.8%	3.3%	3.0%	3.8%
LCV	2.4%	1.7%	1.5%	1.3%	1.2%	1.6%
Bus	1.5%	1.3%	1.1%	1.0%	0.9%	1.1%
2 Axle	1.3%	1.3%	1.1%	1.0%	0.9%	1.1%
3 Axle	1.3%	2.1%	1.9%	1.7%	1.5%	1.7%
MAV	2.4%	3.4%	3.0%	2.7%	2.4%	2.7%
Total	3.7%	3.4%	3.0%	2.7%	2.5%	3.0%
PCU	2.9%	3.0%	2.7%	2.4%	2.2%	2.6%

Source: Steer analysis

**Table 5.48: Revenue (INR Crore), A3 TP1 Kognoli**

Kognoli	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	22	22	18	20	36	56	81	113	157	213
LCV	7	8	7	7	13	18	23	29	36	45
Bus	6	6	5	6	10	13	16	21	26	31
2A	9	10	7	8	15	19	24	31	38	46
3A	10	10	7	8	15	20	27	34	44	56
MAV	22	23	17	19	35	51	71	97	131	173
Total	76	80	63	67	125	178	243	325	431	565

Source: Steer analysis

**Table 5.49: Traffic forecast, A3 TP2 Hattargi**

Hattargi	FY21	FY22	FY27	FY32	FY37	FY42	FY47	FY50
CJV	8,525	8,763	11,180	13,810	16,628	19,596	22,727	24,671
LCV	2,246	2,277	2,561	2,790	3,007	3,214	3,412	3,526
Bus	858	867	934	996	1,054	1,108	1,159	1,188
2 Axle	2,051	2,069	2,211	2,358	2,494	2,622	2,742	2,811
3 Axle	1,217	1,231	1,310	1,453	1,595	1,734	1,871	1,951
MAV	1,690	1,723	1,941	2,288	2,653	3,032	3,420	3,657
Total	17,810	18,171	21,530	25,212	29,065	33,050	37,180	39,716
PCU	33,144	33,720	38,566	44,287	50,204	56,261	62,470	66,249

Source: Steer analysis

**Table 5.50: Final (background plus impacts) traffic growth rates (%), A3 TP2 Hattargi**

Hattargi	FY22 – FY27	FY27 – FY32	FY32 – FY37	FY37- FY42	FY42 – FY50	FY22 – FY50
CJV	5.0%	4.3%	3.8%	3.3%	3.0%	3.8%
LCV	2.4%	1.7%	1.5%	1.3%	1.2%	1.6%
Bus	1.5%	1.3%	1.1%	1.0%	0.9%	1.1%
2 Axle	1.3%	1.3%	1.1%	1.0%	0.9%	1.1%
3 Axle	1.3%	2.1%	1.9%	1.7%	1.5%	1.7%
MAV	2.4%	3.4%	3.0%	2.7%	2.4%	2.7%
Total	3.5%	3.2%	2.9%	2.6%	2.4%	2.8%
PCU	2.7%	2.8%	2.5%	2.3%	2.1%	2.4%

Source: Steer analysis

**Table 5.51: Revenue (INR Crore), A3 TP2 Hattargi**

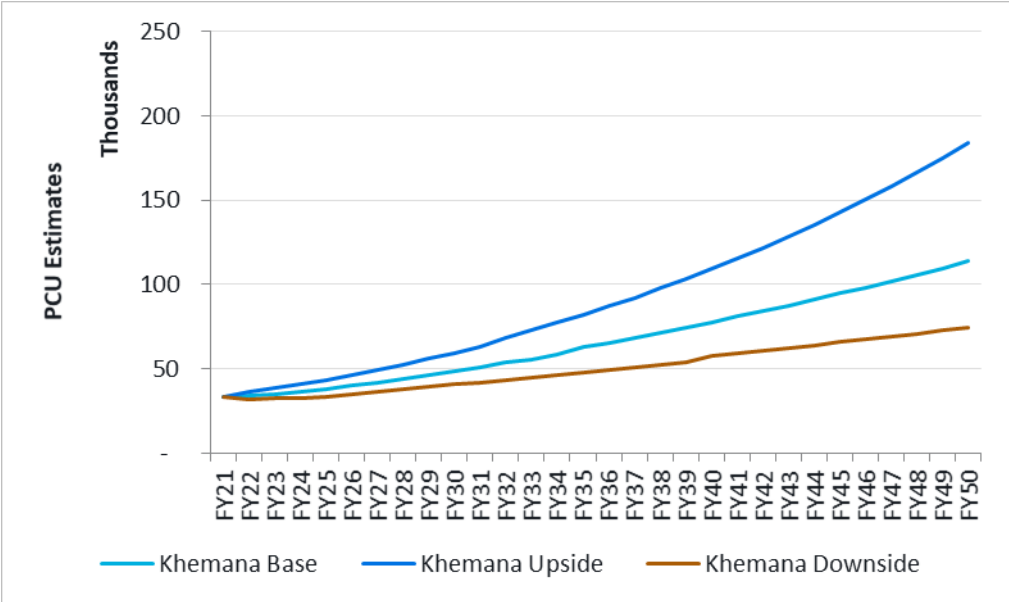
Hattargi	FY21	FY22	FY23	FY24	FY25	FY30	FY35	FY40	FY45	FY50
CJV	8	8	7	8	13	26	39	55	75	102
LCV	3	3	3	3	5	9	12	15	18	23
Bus	3	3	2	2	4	7	9	11	14	17
2A	6	7	5	5	9	17	21	27	33	41
3A	4	4	3	3	6	12	16	20	26	33
MAV	9	9	7	8	13	27	37	51	68	91
Total	34	35	27	29	51	98	134	180	235	308

Source: Steer analysis

Comparison of Upside and Downside Cases

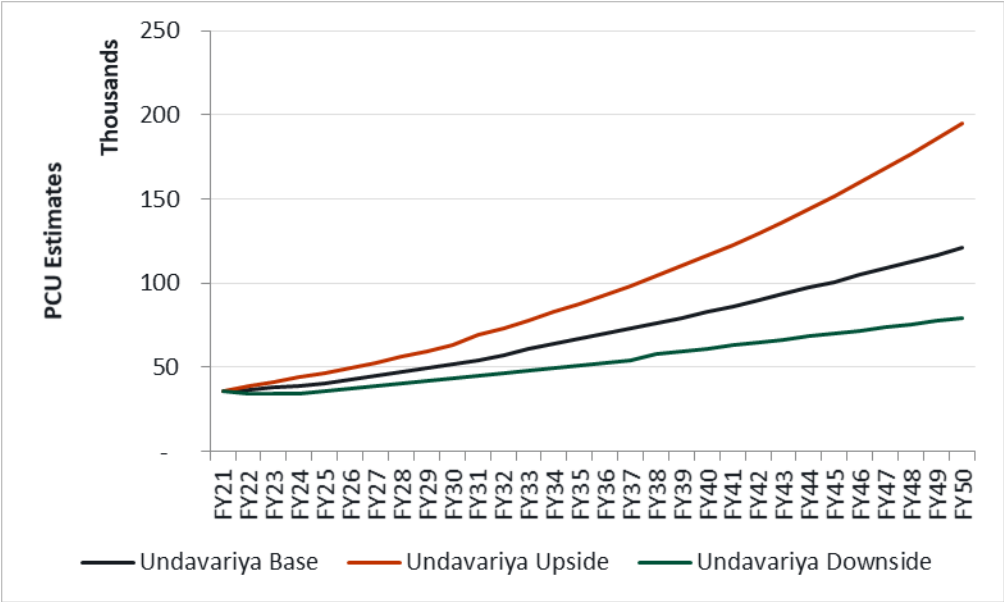
5.43 The below charts present the comparison of Base PCU forecasts to Upside and Downside forecast assumptions

Figure 5.11: Asset 1, Base PCU as compared to Upside and Downside scenarios



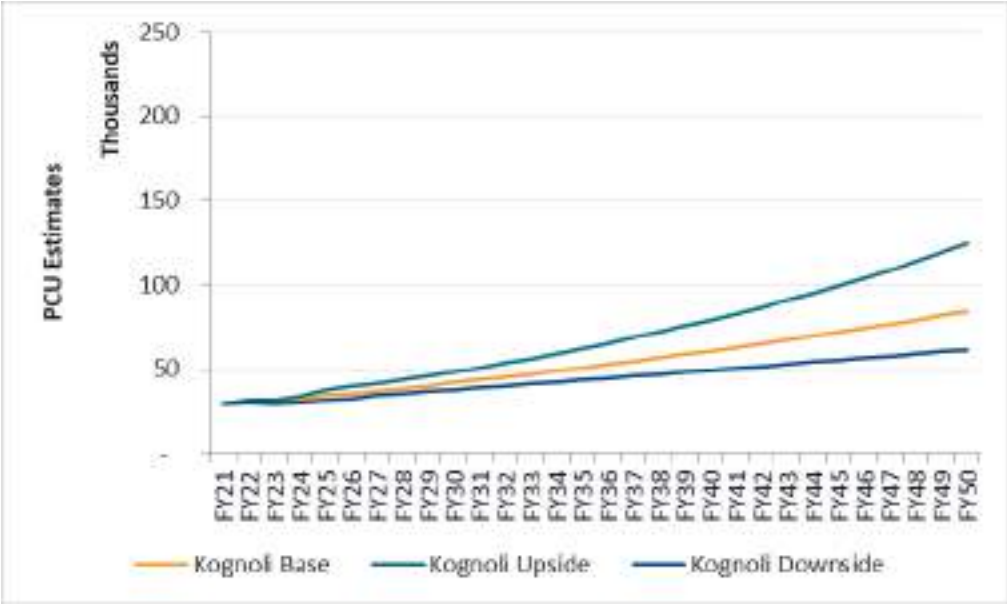
Source: Steer Analysis

Figure 5.12: Asset 2, Base PCU as compared to Upside and Downside scenarios



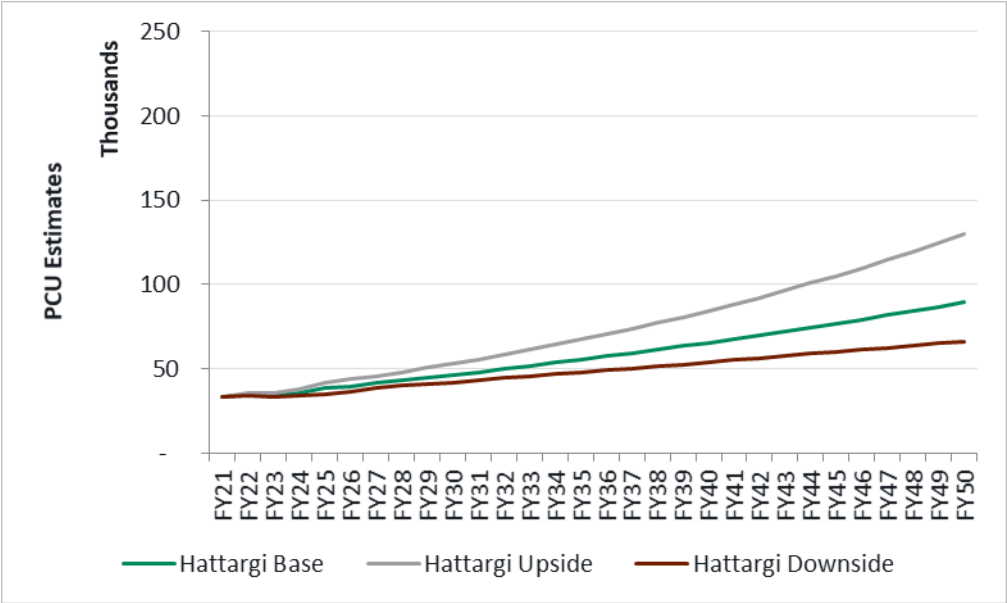
Source: Steer Analysis

Figure 5.13: Asset 3 Kognoli, Base PCU as compared to Upside and Downside scenarios



Source: Steer Analysis

Figure 5.14: Asset 3 Hattargi, Base PCU as compared to Upside and Downside scenarios



Source: Steer Analysis



## Summary

- 5.44 The analysis presented in this report and the methodology followed adopted presents a custom approach compared to a standard traffic and revenue forecasting approach in the industry. The report lists out several reasons for this, most important of which is inconsistency amongst various pieces of data tabled from various sources and lack of clarity for the forecasting assumptions included in the Base Report. It is therefore, we utilised information from various sources, backed by our knowledge of toll roads in the regional setting of the study Assets, in order to triangulate a robust base T&R position before presenting our views on other key topics, such as growth forecasts, traffic segmentation, impacts of increased ETC penetration and so on.
- 5.45 Overall, we believe, we have tabled a robust set of forecast numbers underpinned by a rigorous base T&R position, background growth, exogenous impacts coupled with our unparallel market knowledge of the toll road industry.
- 5.46 The Assets covered in the study present a balanced mix of movements between local and national significance, and we expect these to grow in tandem with the national economy. Comparatively, Asset 1 and Asset 2 presents a stronger underlying growth trend than the Asset 3 which has more locally driven traffic in addition to the long-distance traffic on the golden quadrilateral.
- 5.47 As discussed in detail the recovery from the decrease in traffic due to the lockdowns to PreCovid19 levels has been seen on these Assets. Our forecasts assume that there will be no further lockdowns which will result in an impact on the traffic levels currently being observed on each of the Assets.

## Control Information

### Prepared by

---

Steer  
Suite No. S3, Vatika Business Centre,  
Vatika Triangle, MG Road,  
Gurgaon, Haryana, 122002,  
India  
+91 124 441 8650  
www.steergroup.com

### Prepared for

---

National Highways Infra Investment Managers Private Limited  
G - 5 & 6, Sector 10,  
Dwarka,  
New Delhi – 110075

### Steer project/proposal number

---

24033901

### Client contract/project number

---

Project Speed

### Author/originator

---

Vaibhav Gupta



### Reviewer/approver

---

Serbjee Kohli



### Other contributors

---

### Distribution

---

Client:

Steer:

### Version control/issue number

---

Final

### Date

---

25 March 2021

To NHIIMPL  
Cc  
From Vaibhav Gupta  
Date 18 August 2021  
Project Pioneer

## Memo

Project No. 24033901

# Updated T&R Projections due to the impact of 2<sup>nd</sup> wave of Covid19 infections on traffic estimates on Assets under consideration

## Executive Summary

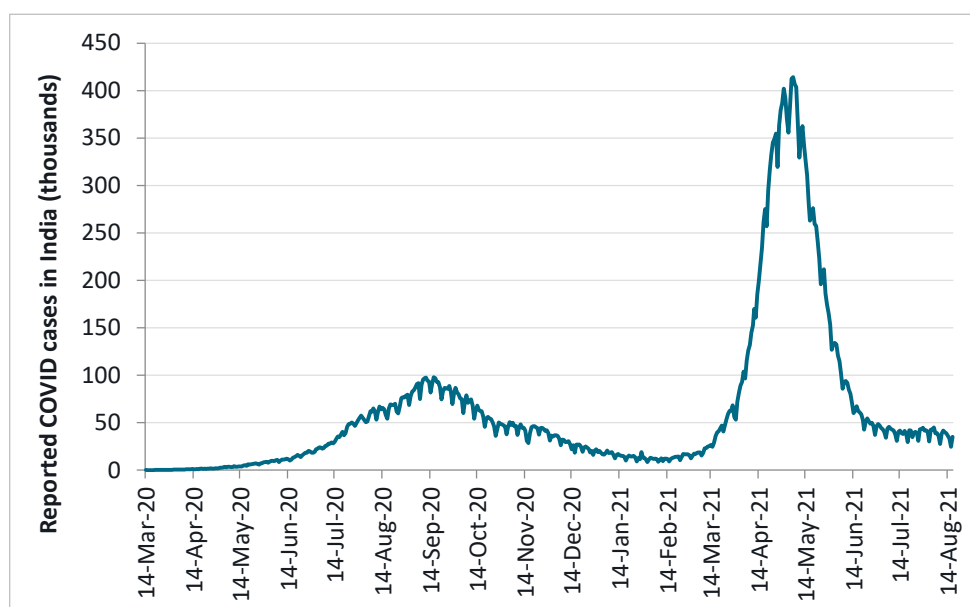
1. Steer was commissioned to carry out a review of traffic forecasts for 3 assets by NHIIMPL early 2021. These assets are:
  - Palanpur-Abu Road (PA)
  - Abu Road-Swarooganj (AS)
  - Belgaum-Kagal (BK)
2. As part of the review a new set of traffic forecast were developed which were based on secondary analysis of the data provided by the client and internal benchmarks available with Steer for similar assets. The analysis of the current Asset conditions were based on toll plaza data and traffic count available for October-November 2020 period. The traffic and revenue forecasts were shared in report dated 25<sup>th</sup> March 2021.
3. In these forecasts the impact of second wave of the Covid-19 pandemic was not considered as it started impacting the wider economy and traffic performance of these assets from April-2021 onwards. More recently the NHIIMPL has shared updated traffic data for January to early August 2021 period which also includes granular vehicle and ticket type segmentation information.
4. This note summarises a review of the traffic performance of these three assets during the second wave of the Covid-19 pandemic and the recovery of traffic as the second wave of the pandemic has abated. It is evident that:
  - Both PA and AS saw April and May months impacted significantly (-20%- -30% as compared to March estimates) across all vehicle categories. The impacts were more severe for CJV vehicle category and relatively smaller for the commercial vehicles as the restriction on movements were more stringent on personal users. Subsequently, starting June till early August, both assets have seen a strong recovery with the outturn performance being significantly stronger than the projected estimates.
  - BK asset saw a bigger impact, in particular at the Kognoli plaza which is closer to the Maharashtra-Karnataka border. This was due to the stricter border crossing restrictions being in place which have only been partially removed as the Covid cases have come down. Similar to the PA and AS assets, car traffic was more severely impacted (-70%- -80% as compared to March estimates) however commercial traffic saw a relatively smaller impact. Subsequently, starting June till early August, both toll plazas of this Asset have seen a strong recovery with the outturn performance starting to align with that was projected estimates particularly for commercial vehicles. However, the car traffic volumes continue to lag due to the border crossing restrictions that are still in place for personal movements.

5. For the remaining part of FY22 (September- a new set of traffic estimation exercise has been carried out considering the month-on-month seasonality on each toll plaza and vehicle category starting with the July to August 2021 period actual traffic as the new base. An impact of third wave of the pandemic resulting in a downward impact on the traffic and revenue performance during the months of October and November 2021 has also been considered. Subsequently for the January – March 2022 period seasonality assumptions have been applied to obtain a normal FY22 position. Given the impacts of the second and third wave of the pandemic during FY22 it is this period (Q4 of FY22) that has been considered to develop normalised FY22 which is then used to develop a FY23 forecast.
6. From segmentation perspective, updated ticket categories segmentation have been based on the July-August data has been used to develop the FY22 and FY23 ticket types. The WPI assumption related to the annual escalation has also been updated using the latest forecasts available from RBI.
7. These updated traffic and revenue forecasts for FY22 and FY23 have been compared against the previous forecast in terms of revenue and the comparison is presented in the later sections. The analysis shows that at a combined level across the three Assets the overall revenue difference between the previous estimates for FY23 and the updated estimates is 1.2%, with the current estimates being marginally lower.
8. It is evident that the combined impact of slightly lower traffic due to the Covid-19, updated ticket segmentation based on more recent date and higher WPI linked toll escalation results in a traffic and revenue estimate which are largely in line with the previous estimates. On the basis of this analysis it can be confirmed that the previous estimates of traffic and revenue for these Assets provided in March 2021 report for FY23 and beyond can still be considered as valid.

## Evolution of Covid19 pandemic in India in FY21 and FY22

9. On 24 March FY20, the Central government announced a nationwide 21-day lockdown which was extended for another three weeks until May 3. Further extensions until May 17 and again until May 31 featured relaxations in 'green' and 'orange' zones. Starting 8 June FY21, 'Unlock' phases began. States have also taken their own measures, with Central guidelines being the minimum expected restrictions from States. These lockdowns and restrictions have led to a variable traffic profile depending on the level of economic activity being opened in that region. The tolling across all highways in India was stopped between 25th Mar and 20th Apr for national highways.
10. The traffic volumes since then gradually started recovering on all assets, with varying extent. By Q3 of FY21 traffic levels were already at par FY20 AADT numbers and even higher in some cases where pent up demand led to an increase in traffic. Q4 of FY21 was largely unimpacted by COVID and toll plazas reported stabilised traffic numbers for the duration.
11. Last week of March 2021 onwards, another spike in COVID cases was observed which gradually kept increasing to reach a peak value of 4,15,000 daily cases by 6th May 2021. The figure below presents the daily reported Covid19 cases in India.

**Figure 1: Daily Reported Covid 19 cases in India**



Source: Steer analysis, <https://data.covid19india.org/>

12. This second wave of Covid19 was accompanied by various local and state level night curfews and lockdowns starting from April until end of June. The second wave of Covid19, although had a higher infection rate and more infections, the movement of traffic and goods was not impacted by the same magnitude as the first wave when whole country went under strict lockdown for two quarters. This can be attributed to the fact that almost all the restrictions were localised or at state level. Moreover, there was no restriction on movement of goods vehicles and other services. As the industries and agricultural activities continued to operate, the truck traffic did not fall as steeply as it did in Q1 FY21.
13. To incorporate the impact of Covid19 on the traffic on the Assets, and the availability of actual FY22 traffic data for months up-to 9<sup>th</sup> August 2021, we have revisited the FY22 projections, and analysed the impact on future projections as well. The approach taken is detailed below.



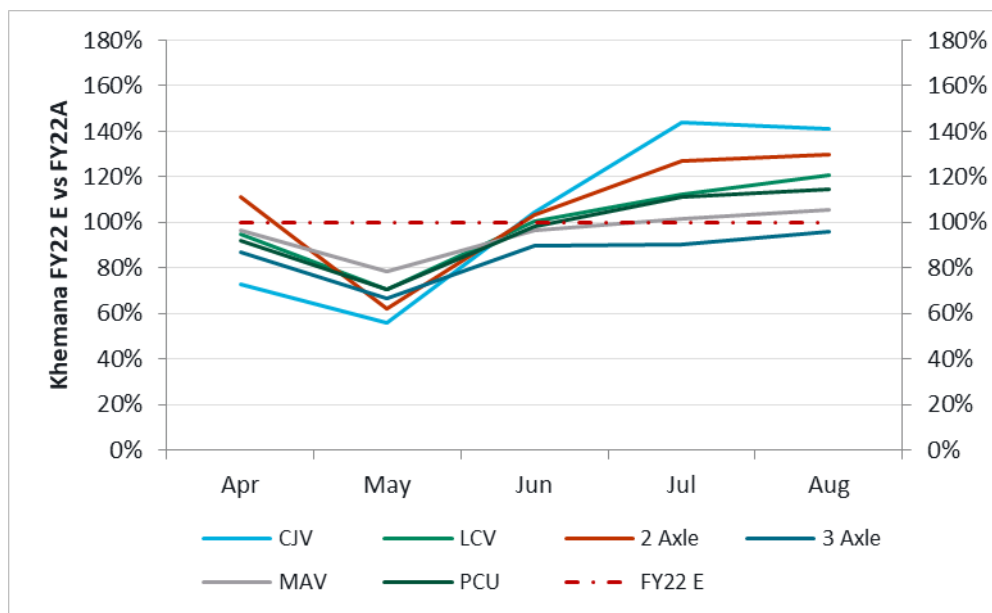
## Estimation of FY22 Base AADT

14. Based on our estimates using the traffic data available up-to December 2020, FY22 was estimated over FY21 AADT that was estimated and the methodology of which has been explained in detail in the traffic report. The traffic data has since been available for now up-to 9<sup>th</sup> August FY22.

### Palanpur Assets: Abu Road – Swaroopganj - Palanpur

15. Please find below the traffic comparison between FY22 estimated vs Actuals for Khemana toll plaza on a month-on-month basis.

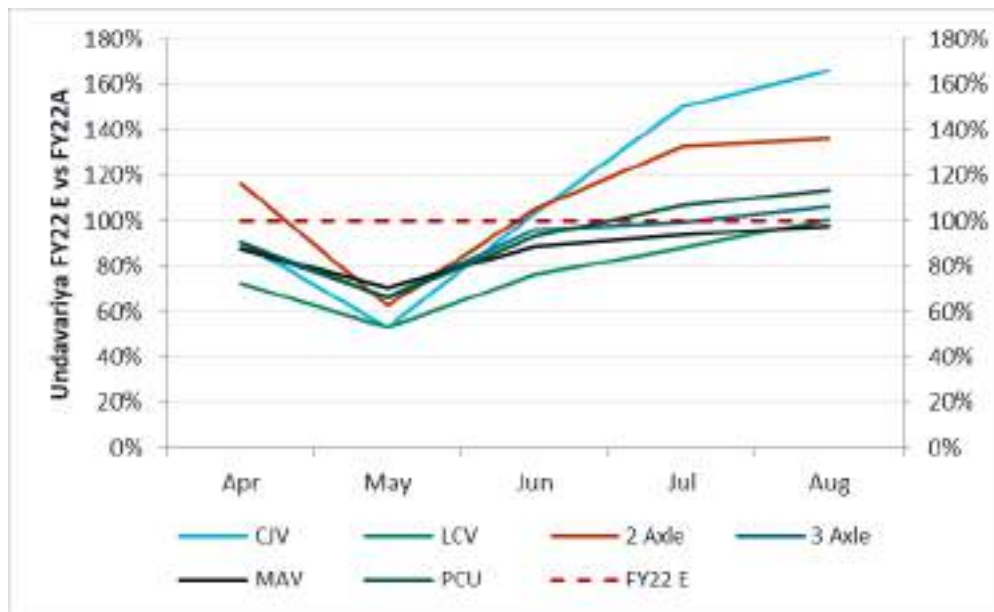
Figure 2: Khemana, FY22 Estimates vs FY22 Actuals for each vehicle type



Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9<sup>th</sup> Aug 2021

16. The 2<sup>nd</sup> wave of Covid19 started impacting traffic on the Asset in late March 2021, when Covid19 related lockdowns started to take place, with traffic across all vehicle types dropping to their lowest levels in May 2021. The impact on passenger vehicles was the highest, dropping to up-to 60% of the estimates, whereas the 3A/MAV traffic dropping to 80% of estimates. The 2A category includes the buses hence the impact is more significant, upto 65% of estimates, in this category. As the Covid19 cases in the region dropped in June, a gradual recovery back to FY22E has been seen across vehicle types and exceeding expected traffic levels by July and continuing in August 2021 as well.
17. Please find below the traffic comparison between FY22 estimated vs Actuals for Undavariya toll plaza on a month-on-month basis.

Figure 3: Undavariya, FY22 Estimates vs FY22 Actuals for each vehicle type



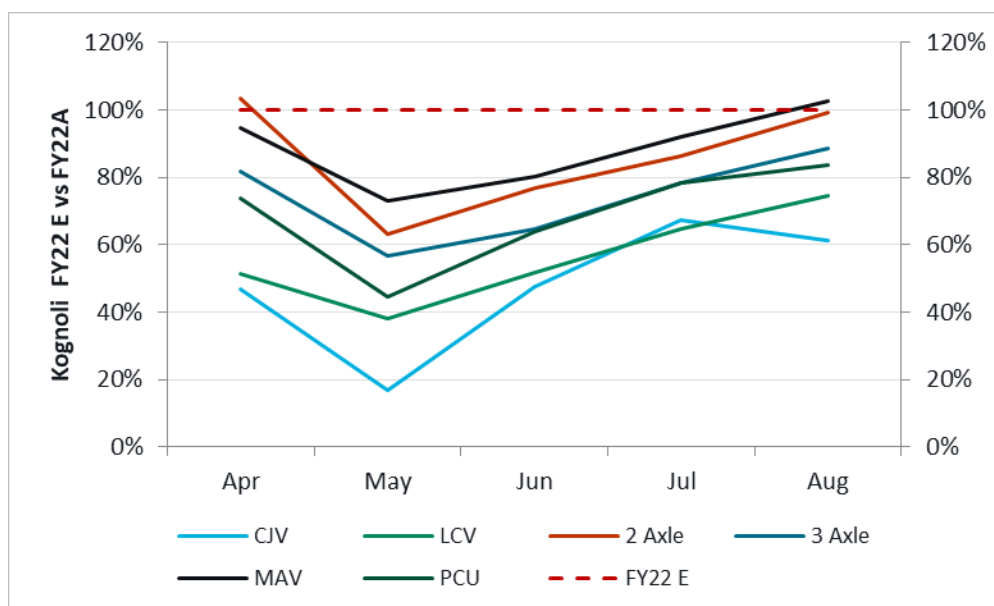
Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9th Aug 2021

18. Similar to Khemana plaza, traffic trends on Undavriya plaza have also shown similar traffic levels in June and July compared to earlier estimates, however the CJV category has outperformed the estimates by a large margin. This can be both related to pent up demand and personal mobility choices being made by users in the absence of train and bus network not yet back to normal levels.

#### Belgaum: Belgaum – Kagal

19. Please find below the traffic comparison between FY22 estimated vs Actuals for Kognoli toll plaza on a month-on-month basis.

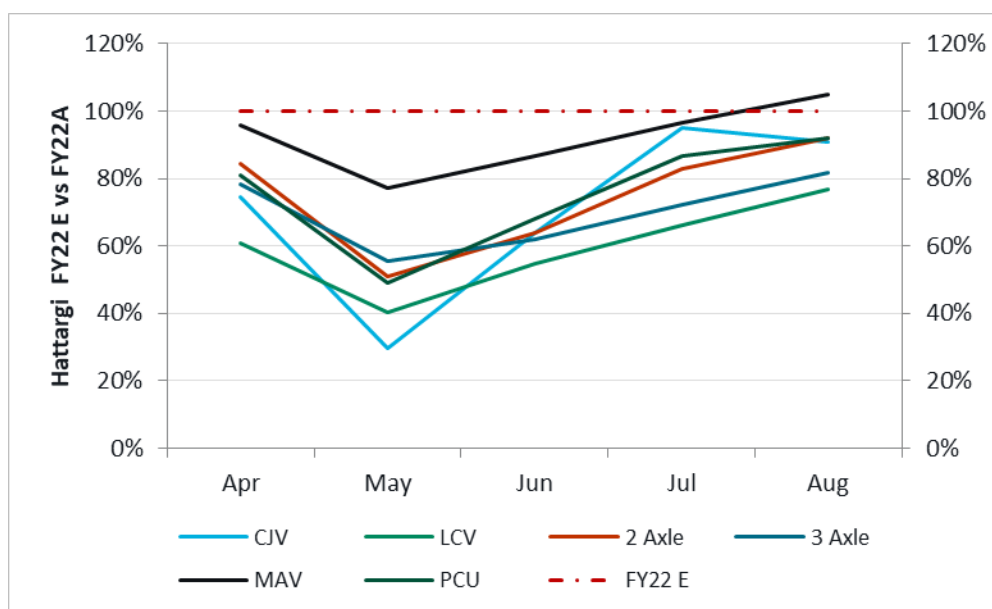
Figure 4: Kognoli, FY22 Estimates vs FY22 Actuals for each vehicle type



Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9th Aug 2021

20. The 2<sup>nd</sup> wave of Covid19 started impacting traffic on the Asset started early in March when cases in the state of Maharashtra started peaking at the start of the 2<sup>nd</sup> Covid19 wave in India. As the Asset lies close to the Karnataka – Maharashtra border strict border controls were enforced for movements of passenger vehicles, resulting in a significant drop in passenger traffic volumes as evident in the traffic data available. Even as the 2<sup>nd</sup> wave has abated some of the border crossing restrictions on passenger movements remain with the Covid negative tests being required for people crossing state borders. This is causing continued suppression of CJV movements while MAV truck traffic is being observed to recover to the F22E levels.
21. The impact on passenger vehicles was the largest, dropping to up-to 20% of the FY22 estimates, whereas the 3A/MAV traffic dropping to 70% of estimates. Covid19 cases in the region have continued to remain higher than the national average and border controls have remained in place resulting in lower traffic recovery in passenger vehicles. 3A/MAV category has started to trend at FY22E levels in the months of June and August.
22. Please find below the traffic comparison between FY22 estimated vs Actuals for Hattargi toll plaza on a month-on-month basis.

Figure 5: Hattargi, FY22 Estimates vs FY22 Actuals for each vehicle type



Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9<sup>th</sup> Aug 2021

23. Similar to Kognoli plaza the traffic recovery on the toll plaza has been slower for passenger vehicles but better than Kognoli plaza as the toll plaza is located further away from Maharashtra border and local traffic within the state has led to higher traffic volumes on the toll plaza.

#### Assumptions on 3<sup>rd</sup> Wave of Covid19 infections and impact on traffic

- 1.1 As we have already seen the third wave of Covid19 infections in other countries (UK, USA, Israel, Russia), it is prudent to believe that a 3<sup>rd</sup> wave of Covid19 infections is likely to occur in India too. Its impact will depend on individual states' preparedness and level of vaccination throughout the country. We have, after compiling information from various sources, taken an assumption for the timing of the 3rd wave and assumed that its magnitude will, in general be smaller than the 2nd wave of infections. ***Note here that this is one of several scenarios that may unfold as the Covid-19 pandemic is currently still unpredictable both in terms of its spread due to various variants, the impact of the vaccination programme in different parts of a region and most importantly the response from local/regional/state/national authorities due***

*to increased rates of infections remains unpredictable. The scenario outlined below is considered to be a reasonable outcome based on information currently available about the impact of 3<sup>rd</sup> Covid wave in India, however the exact outturn remains unpredictable due to the factors outlined above.*

24. We have assumed that the 3<sup>rd</sup> wave of infections is expected to occur during the months of October and November 2021. However, the number of cases in third wave are expected to be lower, due to external interventions like vaccinations, and the lockdowns to be more regional. Further the length of the third wave is expected to be 6 weeks as compared to 10-12 weeks during the 2<sup>nd</sup> wave. Therefore, the overall impact on traffic of 3<sup>rd</sup> wave is expected to be half of the impact that was seen on Assets in the second wave with a faster recovery back to FY22E levels by Dec'2021.

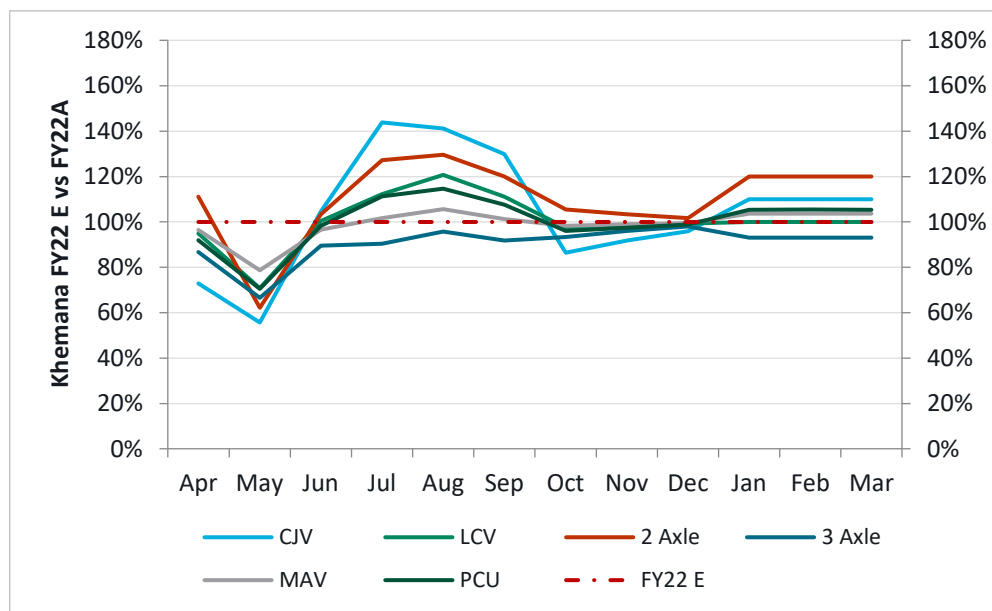
#### Estimation of Q4FY22

25. Q4FY22 is likely to follow the pattern from FY21 and is estimated to stabilize at the FY22E estimated numbers. This Q4 traffic level for each asset is used as a proxy to get a FY22 normalized or FY22N position. The traffic for FY22 is normalised for estimation of FY23, **which includes and assumption that there will be no further waves of Covid19 infections in India**, as these AADT levels are expected to be free of Covid19 related fluctuations, they serve as a stable base position for traffic at each asset.
26. Please find below the revised estimates for FY22 based on the methodology described above:

#### Palanpur Assets: Abu Road – Swaroopganj - Palanpur

27. Please find below the revised traffic estimates for FY22 for Khemana toll plaza on a month-on-month basis as compared to earlier estimates.

Figure 6: Khemana, New FY22 estimates vs FY22E

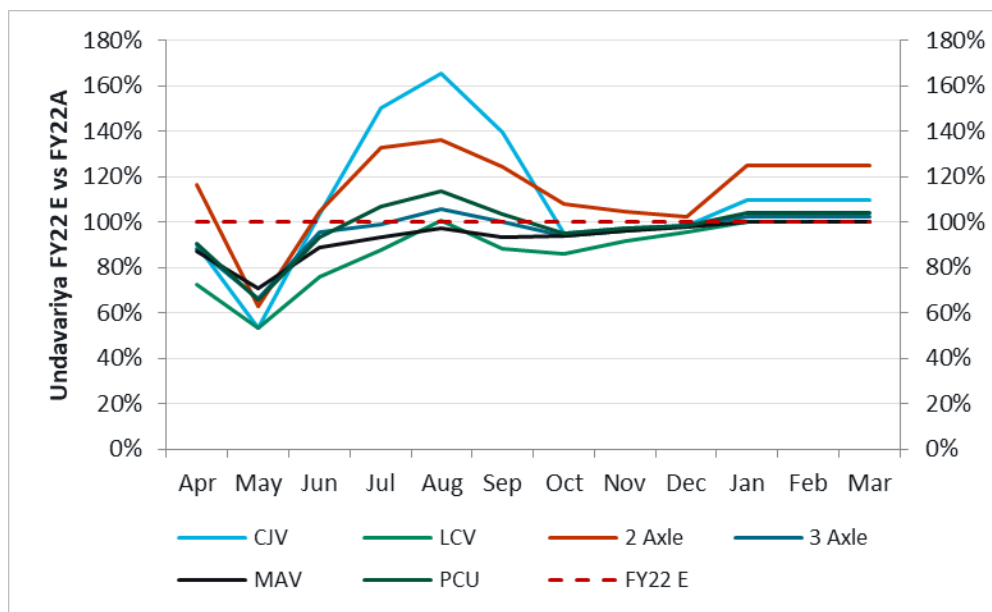


Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9<sup>th</sup> Aug 2021

28. As we can see from the figure above the 3<sup>rd</sup> wave of infections are expected to impact traffic over a 6-week period in Oct and Nov with a swift recovery to FY22E levels by Dec FY21. Q4FY22 is estimated to be as per our initial estimates for FY22E, with some variations based on the traffic that has been observed upto August 2021. These variations are positive in the case of CJV, LCV/2A categories whereas 3Axle have underperformed, which maybe a result of axle shift to MAV category.

29. Please find below the revised traffic estimates for FY22 for Undavariya toll plaza on a month-on-month basis as compared to earlier estimates.

**Figure 7: Undavariya, New FY22 estimates vs FY22E**



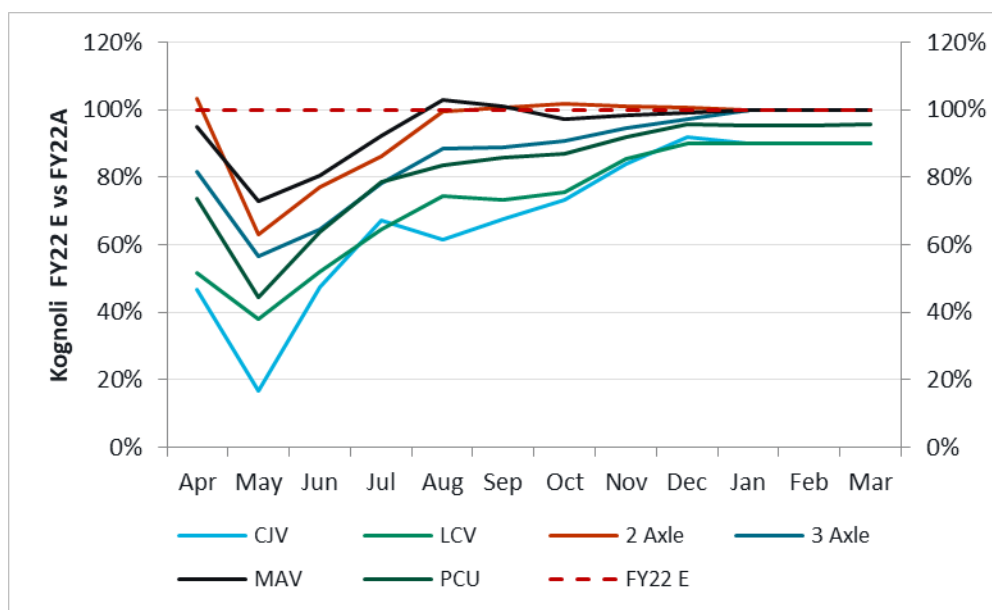
Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9th Aug 2021

30. Similar to the Khemana plaza, traffic levels for 2A/LCV and CJV category are expected to over perform the FY22E based on the trends observed upto August 2021.

#### **Belgaum: Belgaum – Kagal**

31. Please find below the revised traffic estimates for FY22 for Kognoli toll plaza on a month-on-month basis as compared to earlier estimates.

**Figure 8: Kognoli, New FY22 estimates vs FY22E**

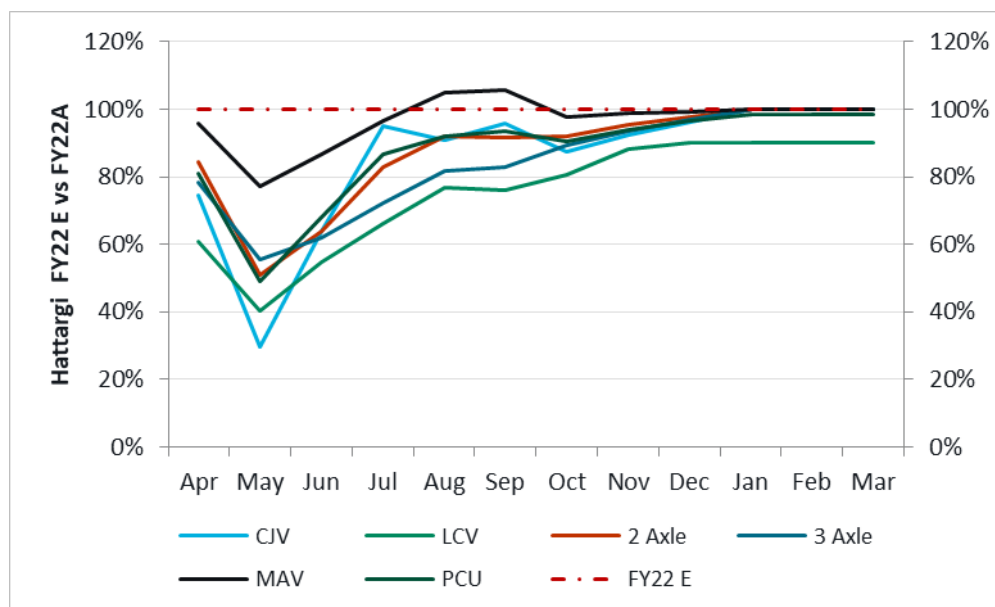


Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available upto 9th Aug 2021



32. As we can see from the figure above the 3<sup>rd</sup> wave of infections are expected to impact traffic over a 6-week period in Oct and Nov with a swift recovery to FY22E levels by Dec FY21. Q4FY22 is estimated to be as per our initial estimates for FY22E, with some variations based on the traffic that has been observed upto August 2021. Slow recovery up to August in CJV, LCV category results in lower projections for these categories for FY22Q4.
33. Please find below the revised traffic estimates for FY22 for Hattargi toll plaza on a month-on-month basis as compared to earlier estimates.

Figure 9: Hattargi, New FY22 estimates vs FY22E



Source: Steer analysis of traffic data provided by client, \*Please note FY22E is adjusted for seasonality, and hence equated to 100 for each month. Data available up-to 9<sup>th</sup> Aug 2021

34. Similar to Kognoli plaza, Q4FY22 is estimated to be as per our initial estimates for FY22E, with some variations based on the traffic that has been observed up-to August 2021. Recovery in CJV, LCV category in August was seen at up-to 90% vs FY22E, therefore it is expected that traffic levels by Q4FY22 should be in line with FY22E.
35. The Table below compares the revised full year FY22 AADT vs FY22E

Table 1: FY22E vs revised FY22 AADT

	Khemana		Undavariya		Kognoli		Hattargi	
	FY22E	Revised FY22	FY22E	Revised FY22	FY22E	Revised FY22	FY22E	Revised FY22
CJV	6,737	7,372	5,951	6,889	9,580	7,764	9,015	8,593
MLCV	276	302	370	428	951	771	1,177	1,122
Minibus	34	35	72	68	45	38	80	66
LCV	360	372	430	410	2,125	1,778	2,310	1,910
Bus	374	425	506	592	795	798	876	842
2 Axle	778	885	721	844	1,189	1,194	2,095	2,013
3 Axle	1,060	1,000	1,001	1,005	1,062	1,009	1,258	1,170
MAV	4,668	4,752	5,364	5,221	1,716	1,713	1,781	1,795
OSV	-	2	-	2	1	2	2	2
Total	14,287	15,145	14,414	15,460	17,465	15,066	18,593	17,512
PCU	35,246	36,608	37,896	38,864	30,651	27,978	34,486	32,839
PCU Delta		3.9%		2.6%		(8.7%)		(4.8%)

Source: Steer analysis. Please note that Base AADT (without impacts) have been compared.

36. As we can see from the table above the PCU differences are positive on the Palanpur Assets and negative on Belgaum Asset primarily because of slower recovery in traffic volumes due to continued restrictions in the region.

*Estimation of FY23 and comparison with March Estimates (FY23E)*

37. FY23 is estimated based on the FY22Q4 Normalised AADT and macro to elasticity relationships. The table below compared the revised full year FY23 AADT vs FY23E (march estimates).

**Table 2: FY23E vs revised FY23 AADT**

	Khemana FY23E	Revised FY23	Undavariya FY23E	Revised FY23	Kognoli FY23E	Revised FY23	Hattargi FY23E	Revised FY23
CJV	7,298	8,069	6,446	7,127	10,141	9,857	9,543	9,664
MLCV	286	330	384	443	977	978	1,210	1,262
Minibus	35	35	74	75	46	44	81	77
LCV	374	377	446	450	2,185	2,050	2,375	2,225
Bus	388	437	525	606	812	880	895	938
2 Axle	796	909	737	863	1,214	1,316	2,139	2,243
3 Axle	1,087	1,018	1,027	1,060	1,096	1,097	1,298	1,299
MAV	4,936	5,133	5,672	5,691	1,803	1,806	1,872	1,874
OSV	-	-	-	-	1	-	2	-
Total	15,200	16,308	15,312	16,315	18,275	18,027	19,413	19,583
PCU	37,224	39,206	40,004	41,553	31,950	31,978	35,862	36,255
PCU Delta		5.3%		3.9%		0.1%		1.1%

Source: Steer analysis. Please note that Base AADT (without impacts) have been compared.

38. As we can see from the table above the PCU differences are positive on the Palanpur Assets driven mostly by CJV volumes and almost flat at Belgaum Asset primarily because of slower recovery in traffic volumes due to a much slower recovery in FY22.

## Estimation of Revenue

### *Assumption on WPI*

39. As per the latest WPI estimates released by RBI dated August 6, 2021<sup>1</sup>, we have adopted a WPI of 9.2% for estimation of FY23 toll rates.

### **Ticket type segmentation**

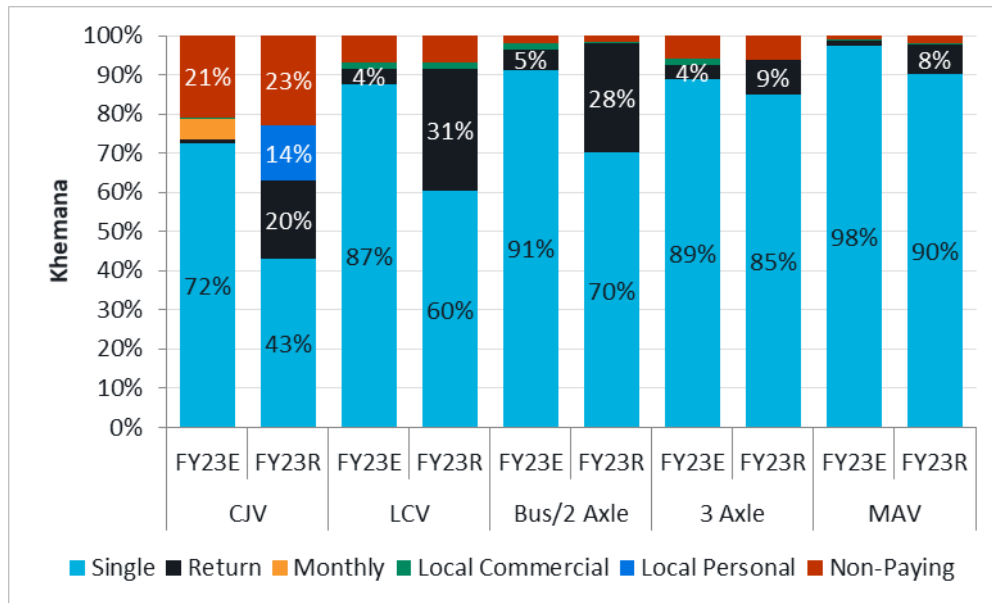
40. The March estimates were based on data available upto December 2020. The toll segmentation arrived was based on the data available through Schedule M and was benchmarked to Assets in the vicinity. Since then NHIIMPL has provided much more granular data on a daily level segmented by ticket type for each vehicle type for January till August 2021 period. The data is further segmented by Fast Tag and Cash transactions. Therefore, we have now utilised the latest data available to revise our segmentation assumptions for FY23 and future projections. The below charts present the segmentation comparison between the revised FY23 and FY23 march estimates (FY23E).

### **Palanpur Assets: Abu Road – Swaroopganj - Palanpur**

41. Please find below the revised traffic segmentation for FY23 for Khemana toll plaza compared to march estimates.

<sup>1</sup>RBI estimates, <https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=20385>

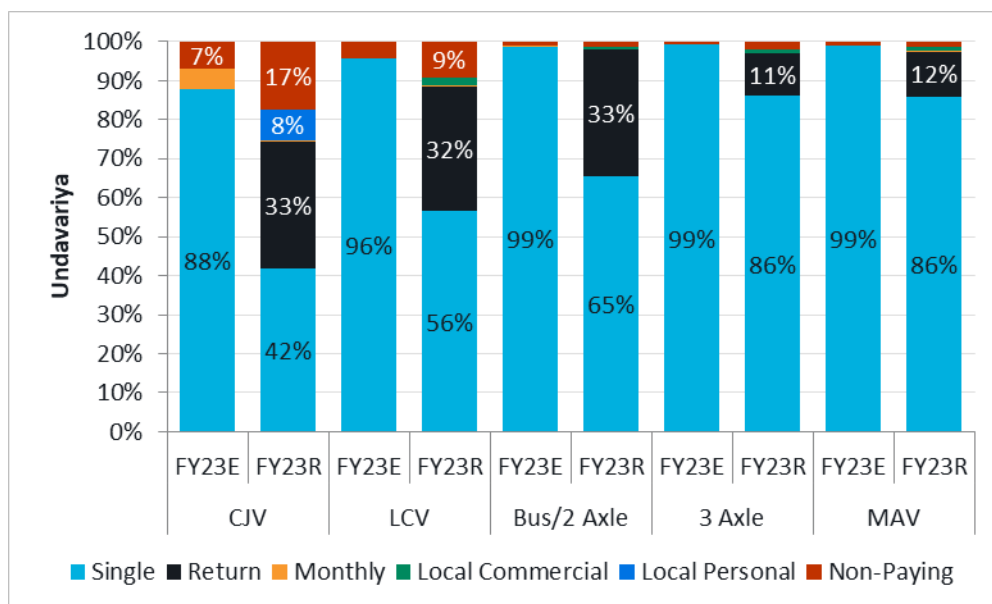
Figure 10: Khemana, Revised FY23 (FY23R) estimates vs FY23E



Source: Steer analysis of Segmentation data provided by client, Data available upto 9<sup>th</sup> Aug 2021

42. Please find below the revised traffic segmentation for FY23 for Undavariya toll plaza compared to march estimates.

Figure 11: Undavariya, Revised FY23 (FY23R) estimates vs FY23E

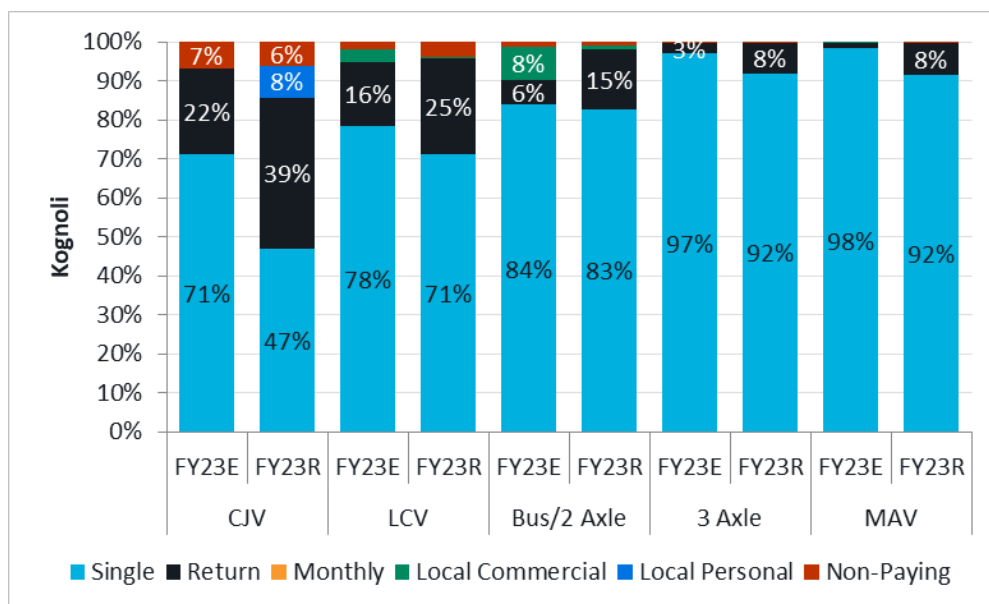


Source: Steer analysis of Segmentation data provided by client, Data available upto 9<sup>th</sup> Aug 2021

### Belgaum: Belgaum – Kagal

43. Please find below the revised traffic segmentation for FY23 for Kognoli toll plaza compared to march estimates.

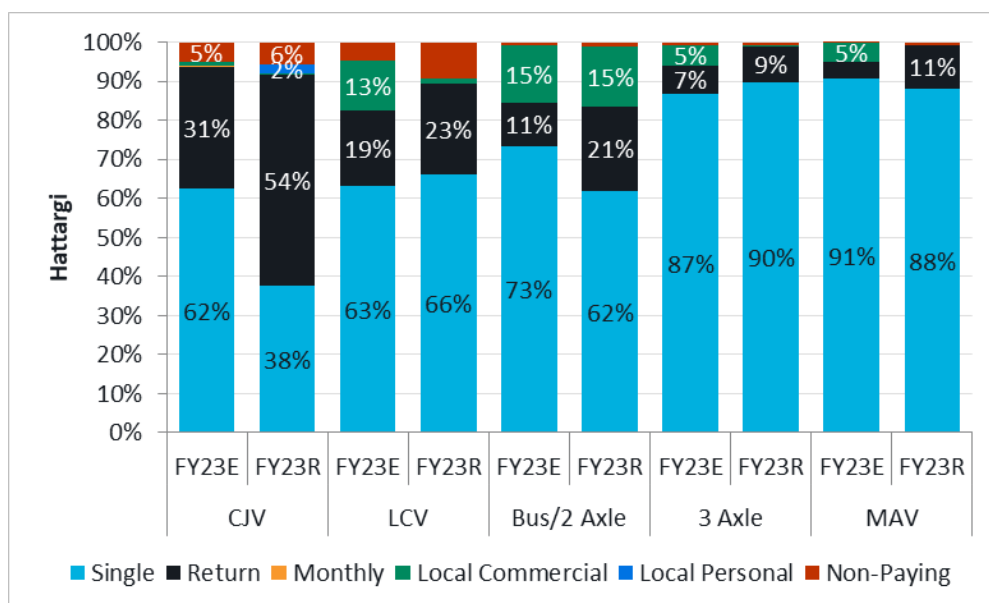
Figure 12: Undavariya, Revised FY23 (FY23R) estimates vs FY23E



Source: Steer analysis of Segmentation data provided by client, Data available upto 9<sup>th</sup> Aug 2021

44. Please find below the revised traffic segmentation for FY23 for Kognoli toll plaza compared to march estimates.

Figure 13: Undavariya, Revised FY23 (FY23R) estimates vs FY23E



Source: Steer analysis of Segmentation data provided by client, Data available upto 9<sup>th</sup> Aug 2021

45. It can be seen from the figures above that in each case the revised segmentation adopted has lower single ticket share and higher return as well marginally higher non-paying shares for CJV and 3A/MAV vehicle categories. Given the granularity of data provided and the time period it pertains to being post the mandatory use of FasTag (Feb 15<sup>th</sup> 2021), the segmentation adopted in the updated forecasts are considered to be a more robust assumption for the revised revenue forecasts presented below.

## Full Year Revenue Estimates

46. Based on the revised segmentation, updated WPI inputs and AADT estimates for FY23 please find below the comparison between the FY23 estimates previously developed and revised FY23 projections. It can be seen that the overall variation across the three assets is around 1.2% in terms of FY23 revenue estimates between the previous and the revised estimates. Therefore the forecasts presented previously can still be considered as valid.

**Table 3: Total Revenue FY23E vs revised FY23 (INR Crore)**

	FY23E	Revised FY23	Difference
Khemana	90	91	0.9%
Undavariya	65	64	(1.8%)
Kognoli	68	66	(2.8%)
Hattargi	30	29	(2.6%)
<b>Total</b>	<b>253</b>	<b>250</b>	<b>(1.2%)</b>

Source: Steer Analysis



# Appendix

## Historical Traffic and Revenue

1. Please find below the Month-on-Month traffic and Revenue for the data from Jan to Aug 2021:

**Table 4: Monthly Average Daily Traffic (MADT) for Khemana Toll Plaza**

Khemana	CJV	LCV	2A/Bus	3A	MAV	OSV	Total	PCU
Jan-21	7,930	597	1,348	1,110	4,978	13	15,976	38,659
Feb-21	8,123	598	1,497	1,149	5,252	15	16,632	40,654
Mar-21	7,106	523	1,499	1,166	5,296	8	15,598	39,754
Apr-21	5,431	403	1,297	987	4,525	6	12,649	33,278
May-21	4,681	295	746	717	3,638	5	10,082	25,906
Jun-21	7,616	386	1,141	905	4,389	6	14,442	34,108
Jul-21	9,001	403	1,314	870	4,414	6	16,007	36,046
Aug-21	8,801	390	1,310	838	4,256	4	15,599	35,001

Source: Steer Analysis of data provided by NHIIMPL, Traffic data available upto 9<sup>th</sup> August 2021

**Table 5: Monthly Average Daily Collection (MADC) for Khemana Toll Plaza (INR Lakhs)**

MADC	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total
Jan-21	2.49	0.48	2.46	1.99	15.14	0.05	22.62
Feb-21	2.86	0.54	2.76	2.18	15.96	0.06	24.36
Mar-21	2.34	0.47	2.79	2.22	16.37	0.03	24.23
Apr-21	1.73	0.37	2.54	1.99	14.51	0.03	21.17
May-21	1.10	0.26	1.49	1.39	11.64	0.02	15.90
Jun-21	2.31	0.33	2.25	1.81	13.95	0.02	20.68
Jul-21	3.00	0.35	2.58	1.86	14.15	0.02	21.97
Aug-21	3.06	0.33	2.59	1.83	13.78	0.02	21.62

Source: Steer Analysis of data provided by NHIIMPL, Revenue data available upto 9<sup>th</sup> August 2021

**Table 6: Monthly Average Daily Traffic (MADT) for Undavariya Toll Plaza**

Undavariya	CJV	LCV	2A/Bus	3A	MAV	OSV	Total	PCU
Jan-21	6,954	662	1,466	1,033	5,194	9	15,318	38,858
Feb-21	7,686	629	1,656	1,117	5,446	17	16,551	41,532
Mar-21	6,930	455	1,655	1,105	5,501	11	15,656	40,696
Apr-21	6,053	393	1,447	946	4,707	7	13,554	35,036
May-21	4,042	282	814	677	3,761	5	9,582	25,889
Jun-21	6,777	374	1,247	914	4,640	6	13,958	34,729
Jul-21	8,471	402	1,459	902	4,672	6	15,911	37,206

Undavariya	CJV	LCV	2A/Bus	3A	MAV	OSV	Total	PCU
Aug-21	9,309	414	1,465	876	4,511	5	16,580	37,276

Source: Steer Analysis of data provided by NHIIMPL, Traffic data available upto 9<sup>th</sup> August 2021

**Table 7: Monthly Average Daily Collection (MADC) for Undavariya Toll Plaza (INR Lakhs)**

MADC	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total
Jan-21	1.97	0.39	1.72	1.43	10.21	0.02	15.74
Feb-21	2.26	0.36	1.94	1.54	10.65	0.04	16.80
Mar-21	1.76	0.26	1.96	1.52	10.81	0.03	16.34
Apr-21	1.30	0.22	1.77	1.36	9.72	0.02	14.40
May-21	0.81	0.14	1.02	0.97	7.77	0.01	10.72
Jun-21	1.45	0.18	1.52	1.28	9.39	0.01	13.83
Jul-21	1.95	0.19	1.78	1.28	9.55	0.01	14.76
Aug-21	2.19	0.20	1.79	1.25	9.23	0.01	14.68

Source: Steer Analysis of data provided by NHIIMPL, Revenue data available upto 9<sup>th</sup> August 2021

**Table 8: Monthly Average Daily Traffic (MADT)for Kognoli Toll Plaza**

MADT	CJV	LCV	2A/Bus	3A	MAV	OSV	Total	PCU
Jan-21	11,190	1,461	2,527	936	1,658	5	17,777	31,253
Feb-21	10,515	1,498	2,633	1,008	1,787	6	17,447	31,752
Mar-21	7,341	1,410	2,516	985	1,796	5	14,052	28,063
Apr-21	4,971	1,226	2,085	865	1,621	4	10,773	22,974
May-21	2,124	883	1,273	600	1,249	2	6,130	14,695
Jun-21	4,903	1,075	1,501	681	1,368	3	9,531	19,232
Jul-21	6,225	1,201	1,593	777	1,477	5	11,278	21,806
Aug-21	6,043	1,394	1,865	910	1,707	3	11,923	24,159

Source: Steer Analysis of data provided by NHIIMPL, Traffic data available upto 9<sup>th</sup> August 2021

**Table 9: Monthly Average Daily Collection (MADC) for Kognoli Toll Plaza (INR Lakhs)**

MADC	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total
Jan-21	6.29	1.51	5.46	2.45	6.20	0.03	21.93
Feb-21	6.58	1.68	5.81	2.66	6.74	0.03	23.50
Mar-21	3.95	1.57	5.59	2.60	6.77	0.03	20.50
Apr-21	2.73	1.30	4.87	2.32	6.33	0.02	17.59
May-21	1.07	0.86	3.02	1.61	4.84	0.01	11.42
Jun-21	2.61	1.08	3.57	1.83	5.32	0.01	14.43
Jul-21	3.75	1.29	3.85	2.09	5.78	0.02	16.79

Aug-21	3.61	1.47	4.51	2.45	6.67	0.02	18.73
--------	------	------	------	------	------	------	-------

Source: Steer Analysis of data provided by NHIIMPL, Revenue data available upto 9<sup>th</sup> August 2021

**Table 10: Monthly Average Daily Traffic (MADT) for Hattargi Toll Plaza**

MADT	CJV	LCV	2A/Bus	3A	MAV	OSV	Total	PCU
Jan-21	10,864	2,153	3,678	1,169	1,791	10	19,665	36,739
Feb-21	10,077	2,143	3,431	1,218	1,925	12	18,807	35,957
Mar-21	8,222	1,892	3,050	1,132	1,870	9	16,174	32,059
Apr-21	7,686	1,596	2,548	982	1,698	7	14,517	28,344
May-21	3,668	1,036	1,541	694	1,366	4	8,309	18,091
Jun-21	6,341	1,253	1,870	775	1,533	5	11,777	23,075
Jul-21	8,511	1,354	2,286	848	1,608	7	14,614	27,211
Aug-21	8,661	1,584	2,583	996	1,806	5	15,636	29,926

Source: Steer Analysis of data provided by NHIIMPL, Traffic data available upto 9<sup>th</sup> August 2021

**Table 11: Monthly Average Daily Collection (MADC) for Hattargi Toll Plaza (INR Lakhs)**

MADC	CJV	LCV	2-Axle	3-Axle	MAV	OSV	Total
Jan-21	2.87	0.94	3.05	1.18	2.63	0.02	10.69
Feb-21	2.99	1.03	2.94	1.26	2.86	0.03	11.10
Mar-21	2.46	0.96	2.62	1.16	2.77	0.02	9.98
Apr-21	2.26	0.80	2.33	1.05	2.58	0.02	9.04
May-21	1.01	0.50	1.45	0.74	2.05	0.01	5.76
Jun-21	1.68	0.54	1.70	0.82	2.30	0.01	7.05
Jul-21	2.15	0.57	1.98	0.90	2.41	0.01	8.02
Aug-21	2.24	0.67	2.27	1.07	2.72	0.01	8.98

Source: Steer Analysis of data provided by NHIIMPL, Revenue data available upto 9<sup>th</sup> August 2021



Intended for

**NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED**

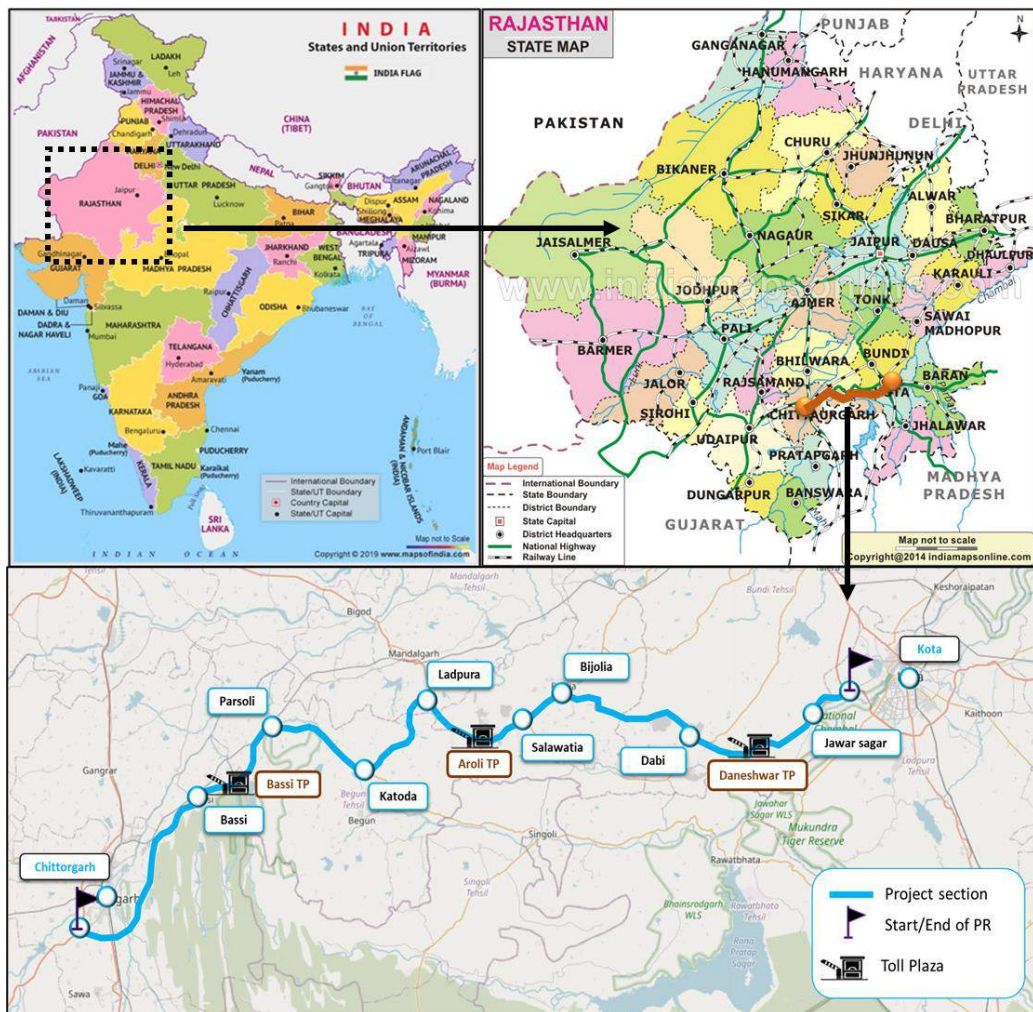
Document type

**Traffic Study Report**


Date

**March 2021**

# INDEPENDENT REVIEW OF TRAFFIC FEASIBILITY STUDY FOR CHITTORGARH- KOTA





Revision	<b>00</b>	
Date	<b>10/03/2021</b>	
Made by	<b>Alvin/Harpreet</b>	
Checked by	<b>Meenakshi Asija</b>	
Approved by	<b>Srinivas Chekuri</b>	
Description	<b>Traffic Study Report</b>	

Ramboll  
The Epitome  
Building No.5, Tower-B  
Floor-17  
DLF Cyber Terrace Phase-III  
Gurgaon-122 002  
India  
T +91 124 4611 999  
F +91 124 4611 998  
[www.ramboll.in](http://www.ramboll.in)

## DISCLAIMER

*This Report is intended for the **NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED's** sole and exclusive use and is not for the benefit of any third party and may not be distributed to, disclosed in any form to, used by, or relied upon by, any third party, except as agreed between the Parties, without prior written consent of Ramboll, which consent may be withheld in its sole discretion.*

*Use of this Report or any information contained herein, if by any party other than the Client, shall be at the sole risk of such party and shall constitute a release and agreement by such party to defend and indemnify Ramboll and its officers, employees from and against any liability for direct, indirect, incidental, consequential or special loss or damage or other liability of any nature arising from its use of the Report or reliance upon any of its content. To the maximum extent permitted by law, such release from and indemnification against liability shall apply in contract, tort (including negligence), strict liability, or any other theory of liability*

*In preparing this report, Ramboll India Private Limited relied, in whole or in part, on data and information provided by National Highways Infra Investment Managers Private Limited, which information has not been independently verified by Ramboll and which Ramboll has assumed to be accurate, complete, reliable, and current. Therefore, while Ramboll has utilized its best efforts in preparing this Report, Ramboll does not warrant or guarantee the conclusions set forth in this Report which are dependent or based upon data, information, or statements supplied by third parties or the client.*

## ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
BIA	Broad Influence Area
CAGR	Compounded Annual Growth Rate
CK	Chittorgarh-Kota
DBFOT	Design, Build, Finance, Operate and Transfer
DME	Delhi Mumbai Expressway
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
HCV	Heavy Commercial Vehicles
HME	Heavy Machinery and Equipment
IHMCL	Indian Highway Management Company Limited
IIA	Immediate Influence Area
IRC	Indian Road Congress
Km	Kilometre
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NCT	National Capital Territory
NH	National Highway
NHAI	National Highway Authority of India
NHIMPL	National Highways Infra Investment Managers Private Limited
NHDP	National Highway Development Program
NHTIS	National Highway Toll Information System
NPV	Net Present Value
OD	Origin-Destination survey
OECD	Organisation for Economic Cooperation and Development
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
RUCS	Road User Cost Study
SEZ	Special Economic Zone
SH	State Highway

SPV	Special Purpose Vehicle
TP	Toll Plaza
TVC	Traffic Volume Count
VOC	Vehicle Operating Cost
VOT	Value of Time
WPI	Wholesale Price Index
YOY	Year on Year

## CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>9</b>
1.1	General	9
1.2	Project Road	9
1.3	Objective and Scope of Work	11
1.4	Structure of Report	11
<b>2.</b>	<b>REVIEW OF BASE REPORT</b>	<b>13</b>
2.1	Coverage	13
2.2	Annual Average Daily Traffic (AADT)-FY21	13
2.3	Travel Pattern	13
2.4	Commodity Distribution	14
2.5	Traffic Growth Rates in Avanza Study	15
2.6	Traffic Projections and Capacity	18
2.7	Traffic Segmentation	20
<b>3.</b>	<b>BASE TRAFFIC ASSESSMENT AND PROJECTIONS</b>	<b>21</b>
3.1	General	21
3.2	Project Road Characteristics	21
3.3	Base Year Traffic	23
3.4	Travel Pattern	25
3.5	Commodity Distribution	28
3.6	Project Road Traffic	30
3.7	Methodology for Traffic Growth Rate Estimation	35
3.8	Identification of PIA States	36
3.9	Past Economic Growth of PIA	37
3.10	India and PIA Outlook	40
3.11	Review of Past Traffic Data	44
3.12	Past and Future Transport Demand Elasticity	45
3.13	Projected Traffic Growth Rates	49
3.14	Traffic Projections and Capacity Analysis	50
<b>4.</b>	<b>TOLL REVENUE PROJECTIONS</b>	<b>52</b>



4.1	Tolling Strategy	52
4.2	Schedule of User Fee	52
4.3	Tolling Streams	53
4.4	Toll Rates	55
4.5	Toll Revenue Estimates	56
4.6	Scenario Analysis	57

## LIST OF TABLES

Table 2-1: Annual Average Daily Traffic (AADT),FY21 - Avanza Report.....	13
Table 2-2: Zones of Influence - Avanza study .....	14
Table 2-3: Zone wise Goods and Passenger Vehicle Movement- Avanza study .....	14
Table 2-4 : Vehicle-wise Commodity Distribution - Avanza Study .....	15
Table 2-5: Elasticities Considered in Avanza Study .....	15
Table 2-6: Recommended Elasticity Values in Avanza Study .....	16
Table 2-7: PIA GSDP adopted in Avanza study .....	16
Table 2-8: Recommended Growth Rates (%) in Avanza Study .....	16
Table 2-9: Growth Rates (%) under Optimistic Scenario in Avanza Study .....	17
Table 2-10: Growth Rates (%) under Pessimistic Scenario in Avanza Study .....	17
Table 2-11 : Projected Traffic, Avanza study .....	19
Table 2-12: Traffic Segmentation Based on User Fee Collection, Avanza Study .....	20
Table 3-1: Different Data-sets for FY21.....	24
Table 3-2: AADT FY21.....	25
Table 3-3: Major Traffic Movements at TP01 – Bassi Toll Plaza .....	25
Table 3-4 : Major Traffic Movements at TP02 – Aroli Toll Plaza .....	26
Table 3-5: Major Traffic Movements at TP03 – Dhaneshwar Toll Plaza.....	26
Table 3-6: Normalised Regional Distribution (%) for the PR.....	27
Table 3-7: Commodity Distribution (in %) at TP01– Bassi Toll Plaza .....	28
Table 3-8: Commodity Distribution (in %) at TP02– Aroli Toll Plaza .....	29
Table 3-9:Commodity Distribution (in %) at TP03– Dhaneshwar Toll Plaza .....	29
Table 3-10: Diversion Equations Used for Analysis.....	32
Table 3-11: Impact of Delhi-Mumbai Expressway .....	33
Table 3-12: Normalised Regional Distribution (%) for the PR .....	37
Table 3-13: Average Annual Growth Rates (%) of State Income for Rajasthan.....	38
Table 3-14: Average Annual Growth Rates (%) of State Income for other PIA states .....	40
Table 3-15: Main Economic Indicators of PIA States .....	42
Table 3-16: Past Multipliers and Future Outlook of PIA States .....	43
Table 3-17: Future Mode-wise Weighted Income of PIA States.....	43
Table 3-18: Past Traffic Growth at the Three Toll Plazas.....	44
Table 3-19: Past Traffic Comparison from IHMCL AADT .....	45
Table 3-20: Avanza counts of FY18 vs FY21.....	45
Table 3-21: Past Elasticities from Toll Data .....	46
Table 3-22: Past Elasticities from IHMCL Data.....	46
Table 3-23: Recommended Elasticity for Project Road.....	49
Table 3-24: Projected Traffic Growth Rates for Project Road (%).....	50
Table 3-25: Projected Traffic at Chittorgarh-Kota .....	51
Table 4-1: Tolling Distribution (incl. Exemptions & Violations) from FY20 (%).....	53
Table 4-2: Toll Paying Traffic, FY21 .....	54
Table 4-3: Tolling Distribution (excl. Exemptions and Violations), FY21 (%) .....	54
Table 4-4: Toll Rates in Rs/km for Different Vehicle Categories .....	55
Table 4-5: Tolling Lengths at Three Toll Plazas.....	55
Table 4-6: Toll Rates at Toll Plazas (in Rs).....	56
Table 4-7: Toll Revenue (in Rs crore) for Chittorgarh-Kota Road by Mode .....	57
Table 4-8: Comparison of Annual Revenues Forecasts in Rs Millions (Base) to Alternate Traffic Growth Assumptions.....	59

## LIST OF FIGURES

Figure 1-1 : Alignment of NH-27 and important places.....	9
Figure 1-2: Project Road and Toll Plaza Locations.....	10
Figure 1-3: Network Map of Chittorgarh-Kota .....	10
Figure 3-1:Traffic Trends from IHMCL AADT .....	24
Figure 3-2: Location of Sandstone Source Points And Cement Industries.....	28
Figure 3-3: Alignment of Delhi-Mumbai Expressway .....	31
Figure 3-4: Alignment of the Economic Corridors and Feeder Roads.....	35
Figure 3-5: GSDP (in Rs billion) and its Sectoral Composition for Rajasthan.....	38
Figure 3-6: Per Capita Income of Rajasthan from 2011-12 to 2018-19.....	39
Figure 3-7: GSDP (in Rs billion) for Other PIA States .....	40
Figure 3-8: GDP growth in India.....	41
Figure 3-9: GDP Forecast of India by Consensus Economics .....	42
Figure 3-10: Traffic Profile of Toll Plaza Data .....	44

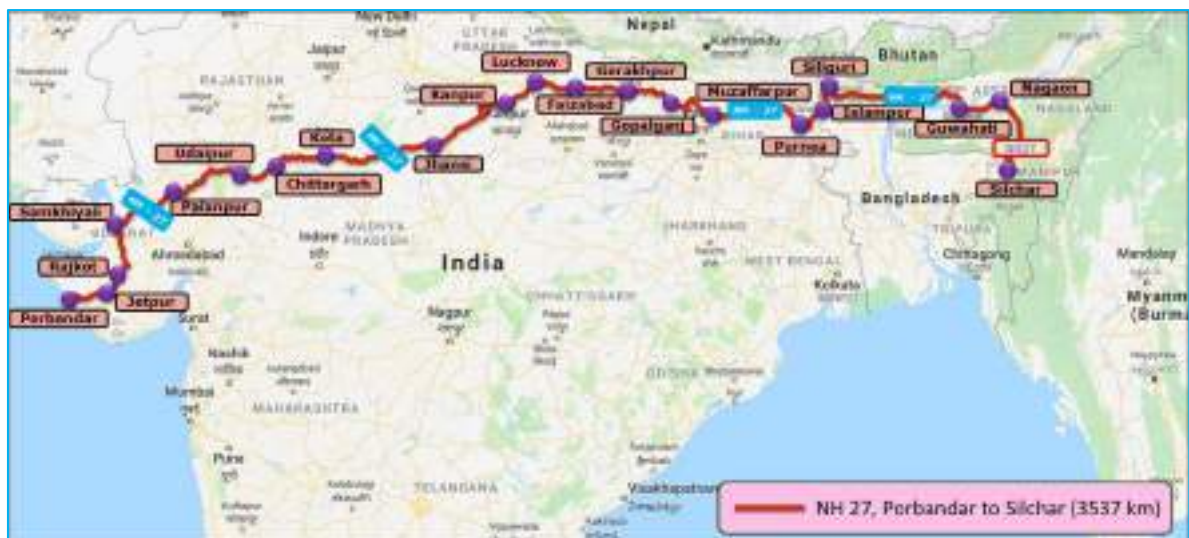
# 1. INTRODUCTION

## 1.1 General

National Highways Authority of India (NHAI) and National Highways Infra Investment Managers Private Limited (NHIIMPL) have identified five road projects for transfer to InvIT in the first stage. Detailed technical and traffic feasibility study reports ("Base Reports") for these roads have been conducted recently by a consultant.

NHIIMPL has appointed M/s. Ramboll India Private Ltd as a traffic consultant to carry out independent review of the Base Report of Chittorgarh-Kota section of NH-27 (carried out by AVANZA) to assess the present traffic levels, travel pattern and revenue estimation for the project, duly considering the network characteristics and future economic perspective in the influence area of the project.

The project highway, NH-27, is part of the East – West corridor envisaged under National Highway Development Program (Phase – II). The total length of NH-27 is roughly 3,530 km starting from Porbandar in the state of Gujarat and ending at Silchar in the state of Assam while passing through the states of Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar and West Bengal. NH-27 connects important tourist and industrial cities and towns like Porbandar (port city), Rajkot, Palanpur, Udaipur, Chittorgarh, Jhansi, Kanpur, Lucknow, Muzaffarpur, Purnea, Siliguri, Jalpaiguri etc. **Figure 1-1** shows the alignment of NH-27 with major places enroute.



**Figure 1-1 : Alignment of NH-27 and important places**

## 1.2 Project Road

The project road section of Chittorgarh – Kota of NH-27 starts from Chittorgarh (Km 891.929) and ends at Kota (Km 1052.429) with total length of 160.5 km in the state of Rajasthan. The major settlements located along the project road section are Ladpura and Bijolia.

The project road in wider context serves for east-west long-distance traffic which is majorly plying between Lucknow/Gorakhpur/eastern region and Palanpur/Rajkot/western region. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Bundi/ Kota/ Baran and Udaipur/ Chittorgarh areas. There are three existing toll plazas on the project road near Bassi, Aroli and Dhaneshwar. The alignment of project road and toll plaza location are shown in **Figure 1-2**.



**Figure 1-2: Project Road and Toll Plaza Locations**

The project road section passes through the districts of Chittorgarh, Bhilwara, Bundi, Kota in the state of Rajasthan.

Figure 1-3 presents the network alignment of the project road along with some of the toll roads in Rajasthan serving East-West and North-South movement of traffic.



**Figure 1-3: Network Map of Chittorgarh-Kota**



### **1.3 Objective and Scope of Work**

- Review of Base Reports including review of traffic data – traffic volume count profile, travel pattern from OD survey data
- Analysis of toll/traffic data and bring it in the financial model format and analyse growth trends
- Study appropriateness of methodology used and assumptions regarding
  - ✓ seasonal correction factor
  - ✓ influence area of project and its economic perspective
  - ✓ present and future elasticity of transport demand by vehicle type
  - ✓ distribution of traffic into different tolling streams (normal paying and concessions as applicable in line with CA)
  - ✓ traffic growth rates
  - ✓ impact of upcoming developments and future development potential of the region
  - ✓ study of impact of competing routes in terms of diversion from/to the project road - Identification of competing routes and network condition, traffic characteristics & level of tolls charged, if any on the competing corridors
  - ✓ scenario testing for toll revenue
- Identification of red flags related to key traffic assumptions covered under the base reports
- Identification of key traffic drivers for the project- both upside and downside
- Based on the issues identified related to key traffic assumptions and methodology, modify the assumptions and update the baseline data and future forecasts
- This will include formulation of future economic outlook based on recent economic performance, extent of impact of COVID 19 and expected economic recovery thereafter- traffic forecast based on revised economic outlook from FY21 onwards
- Update the study report based on the revisions to the key assumptions and future forecasts

### **1.4 Structure of Report**

The report is divided into four chapters, including this introduction chapter. Chapter 2 contains details regarding the methodology adopted by Avanza for base year traffic, travel characteristics in the Project Influence Area (PIA) and traffic growth rates adopted for the study. Chapter 3 contains independent analysis done by Ramboll for the estimation of AADT and the details on the derivation of traffic growth rates used for traffic

forecasting with revenue projections. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections for the duration of the concession.

## 2. REVIEW OF BASE REPORT

### 2.1 Coverage

This chapter covers the review of the methodology adopted by Avanza for base year traffic estimation, travel characteristics in the Project Influence Area (PIA), traffic growth rates adopted for the study and traffic projections.

### 2.2 Annual Average Daily Traffic (AADT)-FY21

As per the base report, Avanza had done seven days classified Traffic Volume Count the months of November 20. Due to uncertain travel conditions influenced by COVID-19, Avanza used a SCF of 1 to convert 7 days average daily traffic to FY21 AADT. The estimated AADT of FY21 as per the Avanza report is presented in the **Table 2-1**.

Modes/TPs	TP01-Bassi	TP02-Aroli	TP03-Dhaneshwar
Car/Jeep	1,165	1,747	1,562
Minibus	25	50	54
Bus	71	97	97
LCV/LGV	152	191	218
2 Axle trucks	268	366	388
3 Axle trucks	264	299	570
MAV	1,145	1,296	1,324
7 Axle+	1	-	1
HCV	3	1	12
Total	3,094	4,047	4,226

**Table 2-1: Annual Average Daily Traffic (AADT),FY21 - Avanza Report**

The seven-day counts presented by Avanza are same as the toll data for the last 7 days of November month.

### 2.3 Travel Pattern

As per the travel pattern analysis by Avanza, area of influence is divided into 3 categories named as immediate influence area, intermediate influence area and long-distance influence area. These zone categories are explained in **Table 2-2**.

Immediate influence area/zone (along the project corridor)	Intermediate influence area/ zone (along the districts of Rajasthan)	Long distance influence area/Other states
Chittorgarh	Dhadhan	Delhi
Nagri	Det	Haryana
Anvalhera	Vijaypur	Maharashtra
Bassi toll plaza	Gangarar	Ajmer
Parsoli	Shahpura	Madhya Pradesh
Bichhore	Barundani	Gujarat
Katoda	Govta	Punjab
Marna	Mandalgarh	Jaipur
Padampura	Thukrai	Agra
Ladpura	Jahajpur	
Menal	Shingoli	
Aroli toll plaza	Jhajpur	
Salawatiya	shingoli	
Bijoliya	Akher	
Budhpura	Bundi	
Dabi	Bhainsrorgarh	
Sootra	Namna	
Dhaneswar toll plaza	Rawatbhata	

Immediate influence area/zone (along the project corridor)	Intermediate influence area/ zone (along the districts of Rajasthan)	Long distance influence area/Other states
Jawahar Sagar	Talera	
Talwandi	Badgaon	
Kota	Kethun	

**Table 2-2: Zones of Influence - Avanza study**

Travel pattern of different modes on Bassi, Aroli and Dhaneshwar toll plazas are explained in **Table 2-3**.

Zones/ Modes	LMV	LCV	Bus	2A	3A	MAV
<b>Bassi Toll Plaza</b>						
Immediate	34.78	31.17	50.00	62.86	2.94	46.71
Intermediate	39.13	47.83	0.00	2.86	58.82	18.25
Long Distance	26.09	21.00	50.00	34.28	38.23	35.04
<b>Aroli Toll Plaza</b>						
Immediate	17.15	41.66	18.75	0.00	21.73	54.23
Intermediate	57.14	16.67	31.25	21.43	30.43	15.25
Long Distance	25.71	41.67	50.00	78.57	47.83	30.51
<b>Dhaneshwar Toll Plaza</b>						
Immediate	57.77	52.78	49.02	22.86	43.55	67.22
Intermediate	33.33	25.00	33.33	57.14	40.32	23.24
Long Distance	10.90	22.22	17.65	20.00	16.13	9.54

**Table 2-3: Zone wise Goods and Passenger Vehicle Movement– Avanza study**

In case of cars, the regions in Rajasthan are the major contributor of traffic at Bassi and Aroli toll plazas while the traffic generated along the project road section is most influential at Dhaneshwar toll plaza.

In case of MAVs, regions along project road section is the major contributor of traffic at all the three toll plazas.

## 2.4 Commodity Distribution

Vehicle wise commodity distribution recorded during Avanza study is presented in **Table 2-4**.

Commodity Type/ Modes	LCV	2A	3A	MAV
Empty	13	7	3	5
Perishable products	35	7	0	0
Food crops	5	15	23	4
Cash crops	0	0	0	0
Manufacturing Products	0	0	0	0
Consumer Products	9	13	0	0
Chemical Products	0	0	0	0
Petroleum Products	0	0	33	0
Textile Products	8	2	0	0
Cement	0	18	0	46
Building Materials	13	13	21	20
Parcel & paper Products	0	0	0	0
Wood and Forest Products	0	0	0	0
Machine and Machine Parts	0	0	0	0
Metals	8	10	0	12

Commodity Type/ Modes	LCV	2A	3A	MAV
Minerals & Ores	0	15	20	13
Rubber & Plastic Products	0	0	0	0
Miscellaneous	9	0	0	0
Total	100	100	100	100

**Table 2-4 : Vehicle-wise Commodity Distribution - Avanza Study**

Cement is the major commodity transported along the PR. Building materials and minerals & ores are the other major commodities transported through PR.

## 2.5 Traffic Growth Rates in Avanza Study

The traffic growth rates in Avanza study have been estimated using elasticity approach. Elasticity of past traffic (2013-17) and vehicle registered in Project influence area (2011-17) as per Avanza study are presented in **Table 2-5**.

Mode	Elasticity- past traffic	Elasticity – Vehicle Registered	Average
<b>Bassi Toll Plaza</b>			
Car	0.44	1.03	0.74
Bus	0.44	0.1	0.27
LCV	0.52	0.54	0.53
2A	-0.54	0.4	-0.07
3A	-0.54	0.4	-0.07
MAV	0.36	0.4	0.38
<b>Aroli Toll Plaza</b>			
Car	0.42	1.03	0.73
Bus	-0.19	0.1	-0.05
LCV	0.52	0.54	0.53
2A	-0.32	0.4	0.04
3A	-0.32	0.4	0.04
MAV	0.58	0.4	0.49
<b>Dhaneshwar Toll Plaza</b>			
Car	0.52	1.03	0.78
Bus	0.48	0.10	0.29
LCV	0.52	0.54	0.53
2A	-0.39	0.40	0.01
3A	-0.39	0.40	0.01
MAV	0.50	0.40	0.45

**Table 2-5: Elasticities Considered in Avanza Study**

The recommended elasticity values under Avanza study for Bassi, Aroli, Dhaneshwar toll plazas are presented in **Table 2-6**

Vehicle Type/ FY	2020 - 2025	2025 - 2030	2030 - 2035	2035 - 2040	2040 - 2045	2045 - 2050
<b>Bassi Toll Plaza</b>						
Car	1.03	0.93	0.83	0.75	0.68	0.61
Bus	0.27	0.24	0.22	0.2	0.18	0.16
LCV/LGV	0.53	0.48	0.43	0.39	0.35	0.31
2 - Axle	-0.07	-0.08	-0.08	-0.09	-0.1	-0.11
3 - Axle	-0.07	-0.08	-0.08	-0.09	-0.1	-0.11
MAV 6+	0.4	0.36	0.32	0.29	0.26	0.24
<b>Aroli Toll Plaza</b>						
Car	1.03	0.93	0.83	0.75	0.68	0.61
Bus	0.1	0.09	0.08	0.07	0.07	0.06



Vehicle Type/ FY	2020 - 2025	2025 - 2030	2030 - 2035	2035 - 2040	2040 - 2045	2045 - 2050
LCV/LGV	0.53	0.48	0.43	0.39	0.35	0.31
2 - Axle	-0.32	-0.35	-0.39	-0.43	-0.47	-0.52
3 - Axle	-0.32	-0.35	-0.39	-0.43	-0.47	-0.52
MAV 6+	0.58	0.52	0.47	0.42	0.38	0.34
<b>Dhaneshwar Toll Plaza</b>						
Car	1.03	0.93	0.83	0.75	0.68	0.61
Bus	0.29	0.26	0.23	0.21	0.19	0.17
LCV/LGV	0.53	0.48	0.43	0.39	0.35	0.31
2 - Axle	-0.39	-0.43	-0.47	-0.52	-0.57	-0.63
3 - Axle	-0.39	-0.43	-0.47	-0.52	-0.57	-0.63
MAV 6+	0.45	0.41	0.36	0.33	0.3	0.27

**Table 2-6: Recommended Elasticity Values in Avanza Study**

The source of GDP growth rate of India till FY24 in Avanza study is from IMF which has been moderated by 0.5 percent to calculate the growth rates. PIA GSDP considered for different time periods is presented in Table 2-7.

Period	PIA GSDP
2020 - 2025	4.02%
2025 - 2030	6.75%
2030 - 2035	6.41%
2035 - 2040	6.09%
2040 - 2045	5.79%
2045 - 2050	5.50%

**Table 2-7: PIA GSDP adopted in Avanza study**

The recommended traffic growth rates adopted under Avanza study for Bassi, Aroli, Dhaneshwar toll plazas are presented in **Table 2-8**.

Vehicle Type/ FY	FY21	FY22	FY23	FY24	FY25	2026 - 2030	2031 - 2035	2036 - 2040	2041 - 2045	2046 - 2050
<b>Bassi Toll Plaza</b>										
Car	0.00	5.35	5.61	5.41	7.51	6.55	5.60	4.79	4.09	3.50
Bus	0.00	1.40	1.46	1.41	1.96	1.71	1.46	1.25	1.07	0.91
LCV	0.00	3.03	3.17	3.06	4.25	3.70	3.17	2.71	2.31	1.98
2 AT	0.00	-0.40	-0.42	-0.41	-0.56	-0.60	-0.63	-0.65	-0.68	-0.71
3 AT	0.00	-0.40	-0.42	-0.41	-0.56	-0.60	-0.63	-0.65	-0.68	-0.71
MAV	0.00	2.29	2.40	2.32	3.21	2.80	2.39	2.05	1.75	1.50
<b>Aroli Toll Plaza</b>										
Car	0.00	5.35	5.61	5.41	7.51	6.55	5.60	4.79	4.09	3.50
Bus	0.00	0.52	0.54	0.53	0.73	0.64	0.54	0.46	0.40	0.34
LCV	0.00	3.03	3.17	3.06	4.25	3.70	3.17	2.71	2.31	1.98
2 AT	0.00	-1.83	-1.92	-1.85	-2.57	-2.74	-2.86	-2.99	-3.12	-3.26
3 AT	0.00	-1.83	-1.92	-1.85	-2.57	-2.74	-2.86	-2.99	-3.12	-3.26
MAV	0.00	3.32	3.48	3.36	4.66	4.06	3.47	2.97	2.54	2.17
<b>Dhaneshwar Toll Plaza</b>										
Car	0.00	5.35	5.61	5.41	7.51	6.55	5.60	4.79	4.09	3.50
Bus	0.00	1.51	1.58	1.52	2.12	1.84	1.58	1.35	1.15	0.99
LCV	0.00	3.03	3.17	3.06	4.25	3.70	3.17	2.71	2.31	1.98
2 AT	0.00	-2.23	-2.34	-2.26	-3.13	-3.34	-3.49	-3.64	-3.81	-3.98
3 AT	0.00	-2.23	-2.34	-2.26	-3.13	-3.34	-3.49	-3.64	-3.81	-3.98
MAV	0.00	2.58	2.70	2.61	3.61	3.15	2.69	2.30	1.97	1.68

**Table 2-8: Recommended Growth Rates (%) in Avanza Study**

In addition, two more sets of growth rate have been presented. The traffic growth rates under optimistic and pessimistic scenario are presented in **Table 2-9** and **Table 2-10**.

Vehicle Type/ FY	FY21	FY22	FY23	FY24	FY25	2026 - 2030	2031 - 2035	2036 - 2040	2041 - 2045	2046 - 2050
<b>Bassi Toll Plaza</b>										
Car	0.00	5.62	5.89	5.69	7.89	6.88	5.88	5.03	4.30	3.68
Bus	0.00	1.47	1.54	1.48	2.06	1.80	1.54	1.31	1.12	0.96
LCV	0.00	3.18	3.33	3.22	4.46	3.89	3.33	2.84	2.43	2.08
2 AT	0.00	-0.42	-0.44	-0.43	-0.59	-0.63	-0.66	-0.69	-0.72	-0.75
3 AT	0.00	-0.42	-0.44	-0.43	-0.59	-0.63	-0.66	-0.69	-0.72	-0.75
MAV	0.00	2.40	2.52	2.43	3.37	2.94	2.51	2.15	1.84	1.57
<b>Aroli Toll Plaza</b>										
Car	0.00	5.62	5.89	5.69	7.89	6.88	5.88	5.03	4.30	3.68
Bus	0.00	0.55	0.57	0.55	0.77	0.67	0.57	0.49	0.42	0.36
LCV	0.00	3.18	3.33	3.22	4.46	3.89	3.33	2.84	2.43	2.08
2 AT	0.00	-1.92	-2.01	-1.95	-2.70	-2.88	-3.01	-3.14	-3.28	-3.43
3 AT	0.00	-1.92	-2.01	-1.95	-2.70	-2.88	-3.01	-3.14	-3.28	-3.43
MAV	0.00	3.49	3.65	3.53	4.89	4.27	3.65	3.12	2.66	2.28
<b>Dhaneshwar Toll Plaza</b>										
Car	0.00	5.62	5.89	5.69	7.89	6.88	5.88	5.03	4.30	3.68
Bus	0.00	1.58	1.66	1.60	2.22	1.94	1.66	1.42	1.21	1.04
LCV	0.00	3.18	3.33	3.22	4.46	3.89	3.33	2.84	2.43	2.08
2 AT	0.00	-2.34	-2.45	-2.37	-3.29	-3.51	-3.66	-3.83	-4.00	-4.18
3 AT	0.00	-2.34	-2.45	-2.37	-3.29	-3.51	-3.66	-3.83	-4.00	-4.18
MAV	0.00	2.71	2.83	2.74	3.79	3.31	2.83	2.42	2.07	1.77

**Table 2-9: Growth Rates (%) under Optimistic Scenario in Avanza Study**

Vehicle Type/ FY	FY21	FY22	FY23	FY24	FY25	2026 - 2030	2031 - 2035	2036 - 2040	2041 - 2045	2046 - 2050
<b>Bassi Toll Plaza</b>										
Car	0.00	5.08	5.33	5.14	7.14	6.22	5.32	4.55	3.89	3.33
Bus	0.00	1.33	1.39	1.34	1.86	1.63	1.39	1.19	1.02	0.87
LCV	0.00	2.88	3.01	2.91	4.04	3.52	3.01	2.57	2.20	1.88
2 AT	0.00	-0.38	-0.40	-0.38	-0.53	-0.57	-0.59	-0.62	-0.65	-0.68
3 AT	0.00	-0.38	-0.40	-0.38	-0.53	-0.57	-0.59	-0.62	-0.65	-0.68
MAV	0.00	2.18	2.28	2.20	3.05	2.66	2.28	1.94	1.66	1.42
<b>Aroli Toll Plaza</b>										
Car	0.00	5.08	5.33	5.14	7.14	6.22	5.32	4.55	3.89	3.33
Bus	0.00	0.49	0.52	0.50	0.69	0.60	0.52	0.44	0.38	0.32
LCV	0.00	2.88	3.01	2.91	4.04	3.52	3.01	2.57	2.20	1.88
2 AT	0.00	-1.74	-1.82	-1.76	-2.44	-2.60	-2.72	-2.84	-2.97	-3.10
3 AT	0.00	-1.74	-1.82	-1.76	-2.44	-2.60	-2.72	-2.84	-2.97	-3.10
MAV	0.00	3.15	3.30	3.19	4.43	3.86	3.30	2.82	2.41	2.06
<b>Dhaneshwar Toll Plaza</b>										
Car	0.00	5.08	5.33	5.14	7.14	6.22	5.32	4.55	3.89	3.33
Bus	0.00	1.43	1.50	1.45	2.01	1.75	1.50	1.28	1.10	0.94
LCV	0.00	2.88	3.01	2.91	4.04	3.52	3.01	2.57	2.20	1.88
2 AT	0.00	-2.12	-2.22	-2.14	-2.98	-3.17	-3.31	-3.46	-3.62	-3.78
3 AT	0.00	-2.12	-2.22	-2.14	-2.98	-3.17	-3.31	-3.46	-3.62	-3.78
MAV	0.00	2.45	2.56	2.47	3.43	2.99	2.56	2.19	1.87	1.60

**Table 2-10: Growth Rates (%) under Pessimistic Scenario in Avanza Study**

## 2.6 Traffic Projections and Capacity

The projections of traffic till 2050 as per Avanza study are presented in **Table 2-11**.

FY/Modes	Car	M LCV	M bus	Bus	LCV	2A	3A	MAV	OSV	HCM	Total vehicles	Total PCUs	% Growth
<b>Bassi Toll Plaza</b>													
2021	1,165	0	25	71	152	268	264	1,145	1	3	3,093	8,407	
2022	1,165	0	25	71	152	268	264	1,145	1	3	3,093	8,407	0.00
2023	1,228	0	25	72	157	262	258	1,174	1	3	3,180	8,578	2.03
2024	1,294	0	26	73	162	255	252	1,206	1	3	3,272	8,763	2.15
2025	1,364	0	26	74	166	250	246	1,237	1	3	3,369	8,952	2.16
2026	1,467	0	26	76	174	242	239	1,282	1	3	3,510	9,226	3.06
2027	1,563	0	27	77	180	234	231	1,323	1	3	3,639	9,471	2.66
2028	1,665	0	27	79	187	226	223	1,364	1	3	3,776	9,730	2.74
2029	1,774	0	28	80	194	218	215	1,407	1	4	3,922	10,003	2.81
2030	1,891	0	28	82	201	211	208	1,452	1	4	4,078	10,292	2.89
2031	2,015	0	29	83	208	204	201	1,497	1	4	4,243	10,597	2.96
2032	2,127	0	29	85	215	197	194	1,538	1	4	4,390	10,864	2.52
2033	2,247	0	30	86	222	190	187	1,579	1	4	4,546	11,145	2.58
2034	2,372	0	30	87	229	184	181	1,622	1	4	4,710	11,438	2.64
2035	2,505	0	31	89	236	177	175	1,665	1	4	4,883	11,746	2.69
2036	2,646	0	31	90	243	171	169	1,710	1	4	5,066	12,068	2.74
2037	2,772	0	32	91	250	165	162	1,750	2	4	5,228	12,350	2.33
2038	2,905	0	32	93	257	159	156	1,790	2	4	5,398	12,643	2.38
2039	3,044	0	33	94	264	153	151	1,831	2	5	5,575	12,949	2.42
2040	3,190	0	33	95	271	147	145	1,873	2	5	5,761	13,267	2.46
2041	3,343	0	34	96	278	142	140	1,916	2	5	5,956	13,598	2.50
2042	3,480	0	34	97	285	137	135	1,954	2	5	6,128	13,887	2.12
2043	3,622	0	34	99	291	131	130	1,993	2	5	6,306	14,186	2.15
2044	3,771	0	35	100	298	126	125	2,032	2	5	6,492	14,496	2.18
2045	3,925	0	35	101	305	122	120	2,072	2	5	6,686	14,816	2.21
2046	4,086	0	35	102	312	117	115	2,113	2	5	6,887	15,149	2.24
2047	4,229	0	36	103	318	112	111	2,148	2	5	7,064	15,437	1.91
2048	4,377	0	36	104	324	108	106	2,184	2	5	7,247	15,735	1.93
2049	4,530	0	37	105	331	104	102	2,221	2	6	7,437	16,042	1.95
2050	4,689	0	37	106	337	99	98	2,259	2	6	7,632	16,358	1.97
<b>Aroli Toll Plaza</b>													
2021	1,747	0	50	97	191	366	299	1,296	0	1	4,048	10,233	
2022	1,747	0	50	97	191	366	299	1,296	0	1	4,048	10,233	0.00
2023	1,840	0	50	98	197	360	294	1,339	0	1	4,179	10,495	2.55
2024	1,940	0	51	98	203	353	288	1,385	0	1	4,319	10,778	2.70
2025	2,045	0	51	99	210	346	283	1,432	0	1	4,466	11,068	2.69
2026	2,198	0	51	99	219	337	276	1,499	0	1	4,680	11,489	3.81
2027	2,342	0	52	100	227	328	268	1,560	0	1	4,878	11,872	3.33
2028	2,496	0	52	101	235	319	261	1,623	0	1	5,087	12,277	3.41
2029	2,659	0	52	101	244	310	254	1,689	0	1	5,311	12,705	3.49
2030	2,833	0	52	102	253	302	247	1,757	0	1	5,548	13,157	3.56
2031	3,019	0	53	103	262	294	240	1,829	0	1	5,800	13,636	3.64
2032	3,188	0	53	103	271	285	233	1,892	0	1	6,027	14,060	3.11
2033	3,367	0	53	104	279	277	226	1,958	0	2	6,266	14,505	3.16
2034	3,555	0	54	104	288	269	220	2,026	0	2	6,518	14,972	3.22
2035	3,755	0	54	105	297	261	214	2,096	0	2	6,783	15,462	3.27
2036	3,965	0	54	105	306	254	208	2,169	0	2	7,063	15,975	3.32

FY/Modes	Car	M LCV	M bus	Bus	LCV	2A	3A	MAV	OSV	HCM	Total vehicles	Total PCUs	% Growth
2037	4,155	0	55	106	315	246	201	2,234	0	2	7,313	16,428	2.83
2038	4,354	0	55	106	323	239	195	2,300	0	2	7,574	16,900	2.87
2039	4,562	0	55	107	332	232	189	2,368	0	2	7,847	17,392	2.91
2040	4,781	0	55	107	341	225	184	2,438	0	2	8,133	17,905	2.95
2041	5,010	0	56	108	350	218	178	2,511	0	2	8,433	18,439	2.98
2042	5,215	0	56	108	358	211	173	2,575	0	2	8,698	18,907	2.54
2043	5,428	0	56	109	367	205	167	2,640	0	2	8,974	19,393	2.57
2044	5,651	0	56	109	375	198	162	2,707	0	2	9,261	19,897	2.60
2045	5,882	0	56	110	384	192	157	2,776	0	2	9,559	20,418	2.62
2046	6,123	0	57	110	393	186	152	2,846	0	2	9,869	20,959	2.65
2047	6,337	0	57	110	400	180	147	2,908	0	2	10,142	21,431	2.25
2048	6,559	0	57	111	408	174	142	2,971	0	2	10,425	21,918	2.27
2049	6,789	0	57	111	416	169	138	3,035	0	2	10,718	22,421	2.29
2050	7,027	0	57	111	425	163	133	3,101	0	2	11,020	22,939	2.31
<b>Dhaneshwar Toll Plaza</b>													
2021	1,562	0	54	97	218	388	570	1,324	1	12	4,226	11,151	
2022	1,562	0	54	97	218	388	570	1,324	1	12	4,226	11,151	0.00
2023	1,645	0	55	98	224	387	567	1,354	1	12	4,345	11,376	2.02
2024	1,734	0	56	100	231	385	565	1,387	1	13	4,472	11,617	2.12
2025	1,828	0	57	101	238	384	563	1,419	1	13	4,604	11,861	2.10
2026	1,965	0	58	103	249	382	560	1,464	1	13	4,795	12,213	2.96
2027	2,094	0	59	105	258	379	556	1,505	1	14	4,972	12,532	2.61
2028	2,231	0	60	107	267	377	553	1,548	1	14	5,158	12,865	2.66
2029	2,378	0	61	109	277	375	550	1,591	1	14	5,355	13,213	2.71
2030	2,533	0	62	111	287	373	546	1,635	1	15	5,564	13,577	2.76
2031	2,699	0	63	112	298	370	543	1,681	1	15	5,784	13,958	2.81
2032	2,851	0	64	114	308	368	540	1,722	1	16	5,982	14,296	2.42
2033	3,010	0	65	116	317	366	536	1,763	1	16	6,190	14,647	2.46
2034	3,179	0	66	117	327	363	533	1,805	1	16	6,408	15,012	2.49
2035	3,357	0	67	119	338	361	530	1,848	1	17	6,638	15,392	2.53
2036	3,545	0	68	121	348	359	526	1,892	1	17	6,878	15,787	2.57
2037	3,715	0	69	122	358	357	523	1,931	1	18	7,093	16,135	2.21
2038	3,893	0	69	124	367	354	519	1,971	1	18	7,317	16,496	2.24
2039	4,079	0	70	126	377	352	516	2,011	2	18	7,551	16,870	2.26
2040	4,274	0	71	127	388	350	513	2,052	2	19	7,795	17,256	2.29
2041	4,479	0	72	129	398	347	509	2,094	2	19	8,049	17,657	2.32
2042	4,663	0	73	130	407	345	506	2,131	2	19	8,275	18,008	1.99
2043	4,853	0	74	131	417	343	502	2,168	2	20	8,510	18,371	2.01
2044	5,052	0	74	133	426	340	499	2,206	2	20	8,753	18,745	2.03
2045	5,259	0	75	134	436	338	495	2,245	2	20	9,005	19,130	2.06
2046	5,474	0	76	136	446	336	492	2,284	2	21	9,267	19,527	2.08
2047	5,666	0	77	137	455	333	489	2,318	2	21	9,498	19,875	1.78
2048	5,864	0	77	138	464	331	485	2,353	2	21	9,736	20,231	1.79
2049	6,070	0	78	139	473	328	482	2,388	2	22	9,983	20,598	1.81
2050	6,282	0	79	141	483	326	478	2,424	2	22	10,237	20,974	1.83

**Table 2-11 : Projected Traffic, Avanza study**

Avanza report mentions that as per the Concession Agreement for InvIT projects, NHAI might undertake the upgrading of the Project Stretch to 6/8-lane configuration in case that the Level of Service C, 60,000 PCU, is reached in the project highway during the concessional period. No capacity augmentation should be considered for this stretch.

## 2.7 Traffic Segmentation

**Table 2-12** gives the traffic segmentation based on monthly user fee collection of 2020 (January to November) from the toll plaza data as presented in Avanza study.

Average Traffic Segment Passing through toll plaza for Year	CJV	LCV/ M Bus	Truck/ Bus (2A)	3A	HCM/ EME	OSV
<b>Bassi Toll Plaza</b>						
No of Monthly Passes	0.2	0.0	0.0	0.0	0.0	0.0
All types of single Entry	75.7	74.3	64.2	65.4	75.3	99.6
Multiple Entry	8.0	10.5	19.8	19.9	14.3	0.1
Re-usage of Multiple Entry ticket	1.1	4.1	2.5	2.3	1.7	0.0
Re-usage of Monthly Passes	5.2	4.4	8.4	9.3	6.5	0.0
Vehicles registered in the District of toll plaza	5.1	2.3	1.1	1.5	2.2	0.0
Exempted etc.	4.7	4.4	4.0	1.6	0.0	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
<b>Aroli Toll Plaza</b>						
No of Monthly Passes	0.2	0.0	0.0	0.0	0.0	0.0
All types of single Entry	72.8	86.1	68.8	68.9	84.8	96.6
Multiple Entry	9.5	7.0	16.6	19.2	10.0	2.4
Re-usage of Multiple Entry ticket	1.0	0.7	2.1	1.4	0.9	0.6
Re-usage of Monthly Passes	6.2	1.9	6.3	9.0	4.2	0.0
Vehicles registered in the District of toll plaza	6.0	0.8	0.8	0.0	0.0	0.0
Exempted etc.	4.2	3.5	5.3	1.4	0.1	0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
<b>Dhaneshwar Toll Plaza</b>						
No of Monthly Passes	0.5	0.0	0.0	0.0	0.0	0.0
All types of single Entry	65.4	85.8	53.4	59.7	77.6	96.8
Multiple Entry	9.9	8.0	27.0	25.1	14.8	2.2
Re-usage of Multiple Entry ticket	1.1	1.1	3.4	2.7	1.9	0.4
Re-usage of Monthly Passes	9.6	2.0	10.7	10.6	5.4	0.0
Vehicles registered in the District of toll plaza	11.7	1.2	1.4	0.4	0.3	0.3
Exempted etc.	1.9	1.9	4.1	1.4	0.0	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

**Table 2-12: Traffic Segmentation Based on User Fee Collection, Avanza Study**



### **3. BASE TRAFFIC ASSESSMENT AND PROJECTIONS**

#### **3.1 General**

The project road is currently under OMT and the projections of traffic and revenue have been presented till 2050 in line with the scope of work. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as they are generally the main/sole source of revenue for the project. This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

#### **3.2 Project Road Characteristics**

A brief description of the profile of the PIA districts is presented below.

##### **Chittorgarh District**

Chittorgarh district is situated in south-east part of Rajasthan. The economy of the district is predominated by agriculture with about 72 percent of the workers being involved in agriculture or as agricultural labourers. The major crops grown in the district are maize, soyabean, groundnut, sorghum, cotton and black gram in kharif season and wheat, mustard, gram, barley and opium in rabi season. Also, cultivation of fruits and vegetables is done in limited portions of land.

The district is rich in mineral resources like barytes, china clay, limestone, sandstone and ochre. Several industries like cement, fabric processing units, chemical and fertilizer manufacturing units, polypropylene, HDPE woven sacks and fabric manufacturing units are present in the district. The cement plants include Birla Corporation Limited, Wonder Cement Limited, Aditya Cement Limited, Lafarge India Private Ltd. and J K Cement Works. Hindustan Zinc Limited has various plants spread across the district which produce sulphuric acid, refined zinc, refined lead etc. There is an atomic power plant and a heavy water plant located at Rawatbhata beside Rana Pratap Sagar dam. In addition to this, the presence of Chittorgarh fort and palaces makes it a famous tourist destination.

The population of Chittorgarh district as per 2011 census is 1.54 million of which 18.5 percent population is urban. The major towns are Chittorgarh, Nimbahera and Rawatbhata. The work participation rate (WPR) of the district is about 52 percent.

##### **Bhilwara District**

Bhilwara district is located in the south-eastern part of Rajasthan and its economy driven by agriculture with 62.6 percent of the total workers involved in the primary sector. The major crops grown in the district include maize, oil seeds, wheat, pulses, jowar, barley and fibres with small quantities of different spices, bajra and some fruits and vegetables. The major agro-based industries here are oil mills, flour mills, ice candy manufacturing units, dal mills and units producing biscuits, confectionary items, khandsari, masala and cattle feed.

The district is also well established in textile industry and known as Vastra Nagari and Manchester of Rajasthan. It is famous for manufacturing of synthetics and cotton mix fabric and synthetic yarn. Cotton textile industries include cotton spinning, cotton ginning, doubling yarn, cotton dyeing, handloom and power loom fabrics and cotton tape producing units.

The mineral resources available in the district include lead, zinc, soap stone, china clay, feldspar, quartz, mica, marble, granite, asbestos and garnet. It is one of the largest producers of raw material required for ceramic industry –quartz feldspar, china clay etc. Several units for manufacturing insulation bricks, mica grinding, marble cutting and polishing, china clay, washing powder etc., have come up attributing to these mineral resources. Rampura Agucha is a zinc and lead mine located on a massive sulphide deposit in the district.

The major products exported from the district are polyester, viscose, woollen blankets, cotton fabric, cotton yarn, woollen shoddy yarn and wool tops.

As per the 2011 Census, the district has a population of 2.40 million of which 21.3 percent population is urban. The work participation rate (WPR) of the district is 47.7 percent.

### **Bundi District**

Agriculture contributes a major portion to the economic growth in Bundi. Major agricultural crops include pulses, wheat, gram, barley, cotton, tobacco and oil seeds. Among oil seeds, mustard and rapeseed are the mostly produced. Important fruit trees in Bundi include orange, pomegranate, lemon, guava and mango. Textile, tourism, handicrafts and small-scale industries play a pivotal role in the economic prosperity of Bundi in Rajasthan. Polyester fiber is the major produce as a part of textiles. The district is famous for its beautiful forts and palaces which have been converted into heritage hotels and step-well reservoirs to attract more tourists.

Limestone and sandstone are important mineral resources found in Bundi district which are the source of raw materials to the cement plant at Lakheri. Other minerals found in the district include silica sand, barytes, marble, clays, granite, sandstone, red ochre and iron ore.

The district has a population of 1.11 million as per 2011 Census with a rural population share at 80 percent and Work Participation rate (WPR) of the district is about 47 percent.

### **Kota District**

Kota is the trade centre for cotton, millet, wheat, coriander and oilseeds. Major cultivated crops include soybean, paddy and maize in kharif season while rapeseed & mustard, wheat, coriander and gram in rabi season. Ramganj mandi in Kota is famous for the stone and coriander market. It is the largest market for coriander in India.

The industries prevalent in the district include cotton and oilseed milling, textile weaving, distilling, dairying, and the manufacture of metal handcrafts. Kota city is known as the “Education hub of India” with the presence of a number of coaching institutes for engineering and medical entrance exams.

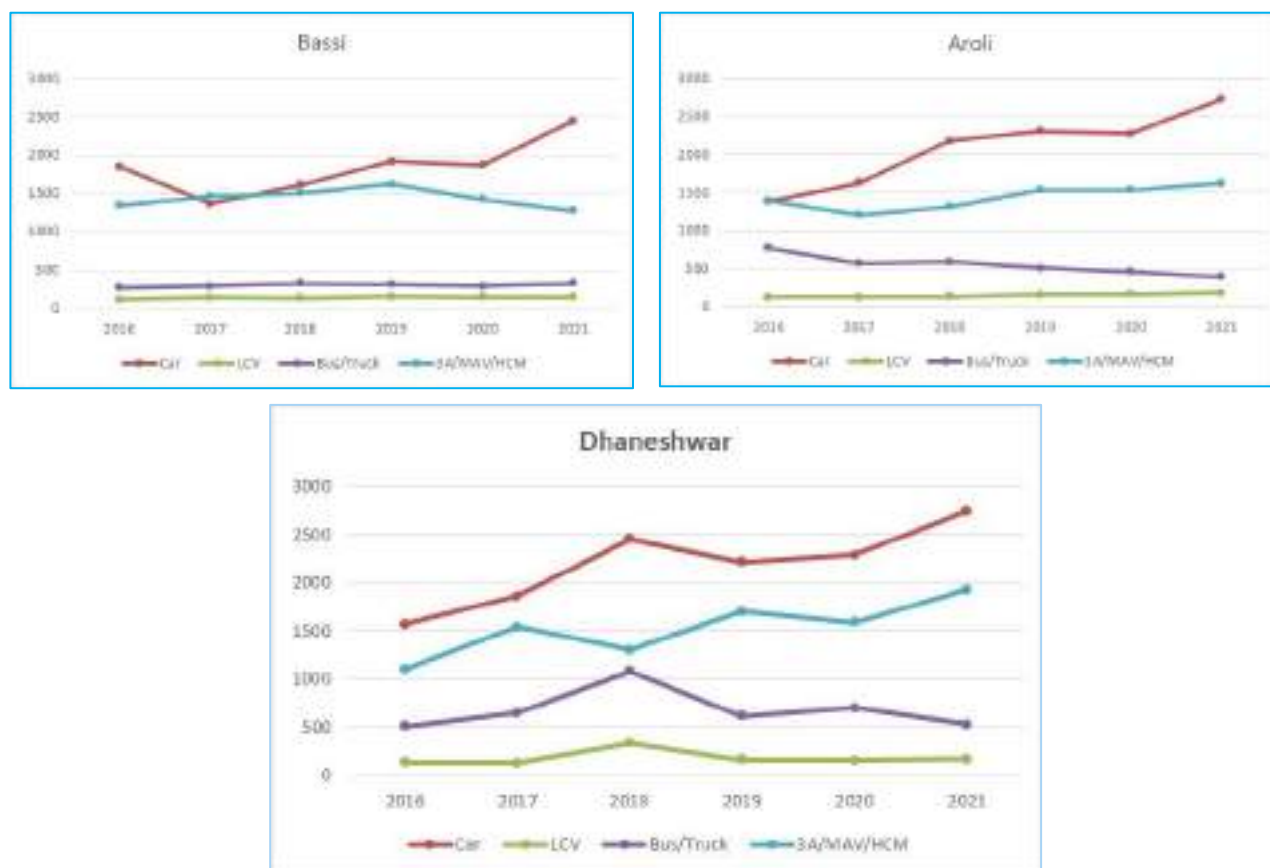
Kota is one of the industrial hubs in northern India, with chemical, cement, engineering and power plants. It is also known for Kota stone, a fine-grained variety of limestone and has an extensive industry of stone-polishing. The district is the 2nd largest producer of limestone stone after Jodhpur. There are deposits of red clay, glass sand, dolomite and kankar in the district along with reported occurrence of iron ore, fire clay, red and yellow ochre. Chambal Fertilizers, one of the largest private sector producers has two plants in the district. Kota has several industrial estates and many chemical units as well.

The district population as per 2011 census is 1.95 million of which 60.3 percent is urban and work participation rate (WPR) is about 38 percent.

### **3.3 Base Year Traffic**

The toll data for the project road has been provided from August 2011 to February 2021. As the year FY21 has been impacted by COVID, the traffic on the toll plazas have shown a high variation in month on month traffic. After opening of the economic activities post lockdown, the traffic on most of the highways has started to get back to normal levels. In case of Chittorgarh-Kota, low traffic levels were observed in April and May at all the three plazas due to complete shutdown of economic activities, which started showing a pickup from June and July. The traffic in August and September has shown a big dip from July which could be due to some local lockdowns or technical glitch in recording of traffic at the toll plazas. The traffic from October till December has shown a consistent increase in traffic to reach the pre COVID levels. The months of January and February show an abrupt increase in car traffic which could be due to better capturing of toll paying traffic at all the toll plazas.

In addition to this, the traffic data from the IHMCL count stations was also assessed. The traffic data available from IHMCL count stations is available for nine months between FY16 and FY21. The counts have been classified into respective financial years and converted into AADT by applying FY18 SCF from respective toll plaza’s data. The graphs in **Figure 3-1** present year on year traffic of different modes in IHMCL data.



**Figure 3-1:Traffic Trends from IHMCL AADT**

The AADT of cars from IHMCL in FY21 is similar to the spike which is being observed in the recent months of January and February.

In addition, seven-day traffic volume count conducted by Avanza in the month of February 2021 was made available.

The AADT from different sets of data for the project road section is presented in **Table 3-1**.

Data Source/ Modes	Car	LCV/M Bus	Bus/Truck	3A/MAV/HCM
<b>Bassi Toll Plaza</b>				
FY20 IHMCL	1,983	153	298	1,407
Dec 20 IHMCL	2,549	150	335	1,294
Feb 21 Toll data	2,926	200	396	1,320
Feb 21 survey data	2,199	347	367	1,595
<b>Aroli Toll Plaza</b>				
FY20 IHMCL	2,252	172	487	1,595
Dec 20 IHMCL	2,924	178	430	1,646
Feb 21 Toll data	4,054	314	693	1,542
Feb 21 survey data	2,620	343	542	1,842
<b>Dhaneshwar Toll Plaza</b>				
FY20 IHMCL	2,342	149	570	1,546
Dec 20 IHMCL	3,032	161	565	1,844
Feb 21 Toll data	3,830	199	807	2,025
Feb 21 survey data	2,673	474	630	1,906

**Table 3-1: Different Data-sets for FY21**

Seven-day traffic volume count data by Avanza is also in line with the Dec 20 IHMCL counts. However, in light of the full implementation of fast tag and resultant efficiency in recording of toll data, February toll data has been adopted as AADT for FY21. Seasonal Correction Factor (SCF) for the month of February derived from the past toll data indicates the factors to be more than 1.0. However, considering the recent uptick in traffic which could be due to pent up demand post opening of economic activities, no SCF was applied. The AADT for FY21 is presented in **Table 3-2** .

Toll plaza/ Modes	Car	LCV/M Bus	Bus	Truck	3A	MAV	OSV	PCU
Bassi Toll Plaza	2,926	200	136	260	35	1,286	2	10,311
Aroli Toll Plaza	4,054	314	201	492	55	1,488	3	13,481
Dhaneshwar Toll Plaza	3,830	199	198	609	126	1,586	2	14,081

**Table 3-2: AADT FY21**

### 3.4 Travel Pattern

To assess the travel pattern of vehicles, the important streams of traffic plying on the project road are estimated from an earlier study available with the consultants. The popular movements at the three toll plazas are presented in **Table 3-3** , **Table 3-4** and **Table 3-5** respectively.

S. No.	Traffic Stream	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
<b>Bassi Toll Plaza</b>									
1	Chittorgarh/Udaipur and beyond-Bundi / Tonk / Jaipur and beyond	12.6	0.0	16.2	3.6	7.5	3.6	9.1	6.0
2	Chittorgarh/Udaipur and beyond-Kota and Surrounding	36.1	20.1	24.3	17.4	23.4	37.7	33.5	36.2
3	Banswara and beyond - Kota and Surrounding	3.4	0.0	4.5	5.1	2.8	3.7	10.7	10.1
4	Palanpur/Gandhidham - Kota and surrounding	4.1	13.1	25.2	10.2	21.7	7.1	9.2	11.0
5	Chittorgarh/Udaipur and beyond - Jhansi / Kanpur / Agra / rest of Uttar Pradesh	1.8	0.0	0.0	5.8	6.7	5.4	3.9	8.6
6	Gandhidham / Ahmedabad / Rest of Gujarat - Jhansi / Kanpur / Agra / rest of Uttar Pradesh	0.9	0.0	10.0	3.6	22.9	11.0	21.6	16.7
7	Chittorgarh/Udaipur and beyond - Bhopal / rest of Madhya Pradesh	0.9	0.0	0.0	0.0	0.0	0.0	2.1	1.1
8	Chittorgarh/Udaipur and beyond - Zones between TP 01 & TP 02	29.8	66.8	18.8	30.0	6.7	17.1	5.5	5.5
9	Chittorgarh/Udaipur and beyond - Zones between TP 02 & TP 03	10.4	0.0	1.0	24.2	8.4	14.4	4.3	4.7
	<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-3: Major Traffic Movements at TP01 – Bassi Toll Plaza**



S. No.	Traffic Stream	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
<b>Aroli Toll Plaza</b>									
1	Chittorgarh /Udaipur and beyond-Bundi / Tonk / Jaipur and beyond	5.1	0.0	9.6	4.0	8.1	12.8	3.9	4.4
2	Chittorgarh /Udaipur and beyond-Kota and beyond	41.8	36.8	26.6	31.4	41.5	30.6	39.2	36.5
3	Banswara and beyond - Kota and beyond	1.5	0.0	2.1	3.0	3.3	1.2	6.7	10.9
4	Palanpur/Gandhidham - Kota and beyond	2.6	0.0	26.1	4.0	15.4	6.5	13.2	12.1
5	Chittorgarh/Udaipur and beyond - Jhansi / Kanpur / Agra / rest of Uttar Pradesh	0.6	0.0	6.1	0.9	7.3	2.4	5.1	5.5
6	Gandhidham / Ahmedabad / Rest of Gujarat - Jhansi / Kanpur / Agra / rest of Uttar Pradesh	0.3	0.0	10.1	1.6	9.8	6.5	20.6	18.6
7	Chittorgarh / Udaipur and beyond - Bhopal / rest of Madhya Pradesh	0.4	0.0	1.1	0.7	0.8	0.8	0.3	2.9
8	Zones between TP01 and TP02 - Kota and beyond	7.1	0.0	3.0	4.3	1.6	4.0	1.3	2.6
9	Chittorgarh /Udaipur and beyond - Zones between TP 02 & TP 03	17.2	10.3	7.2	23.4	10.6	23.5	3.9	5.4
10	Zones between TP 01 & TP 02 - Zones between TP 02 & TP 03	23.4	52.9	8.1	26.7	1.6	11.7	5.8	1.0
	<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-4 : Major Traffic Movements at TP02 – Aroli Toll Plaza**

S. No.	Traffic Stream	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
<b>Dhaneshwar Toll Plaza</b>									
1	Chittorgarh /Udaipur and beyond-Bundi / Tonk / Jaipur and beyond	3.0	0.0	0.0	6.6	2.9	1.4	3.2	3.3
2	Chittorgarh /Udaipur and beyond-Kota and Surrounding	37.7	0.0	40.3	9.5	39.7	28.7	34.9	36.4
3	Banswara and beyond - Kota and Surrounding	1.5	0.0	0.0	2.7	7.1	1.4	6.6	12.1
4	Palanpur/Gandhidham - Kota and Surrounding	3.9	0.0	23.4	1.8	15.6	5.1	5.1	10.7
5	Chittorgarh /Udaipur and beyond - Jhansi / Kanpur / Agra / rest of Uttar Pradesh	0.7	0.0	4.3	0.8	4.0	2.4	3.7	7.3
6	Gandhidham / Ahmedabad / Rest of Gujarat- Jhansi / Kanpur / Agra / rest of Uttar Pradesh	0.7	0.0	7.3	3.2	9.6	4.5	8.8	18.9
7	Chittorgarh /Udaipur and beyond - Bhopal / rest of Madhya Pradesh	0.7	0.0	1.4	7.2	2.5	0.6	0.9	4.2
8	Zones between TP01 and TP02 - Kota and beyond	1.7	0.0	0.0	3.4	0.0	11.9	6.3	4.3
9	Zones between TP 02 & TP 03 - Kota and beyond	50.0	100.0	23.3	64.8	18.7	44.1	30.4	2.8
	<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-5: Major Traffic Movements at TP03 – Dhaneshwar Toll Plaza**

**Passenger Traffic:**

- The car traffic crossing all the toll plaza is around 48-60 percent which are mainly travelling between the regions of Chittorgarh /Udaipur and beyond to Kota and beyond.
- Buses (incl. mini buses), the share of through traffic is around 77-82 percent which are mainly interacting between the regions of Chittorgarh/Udaipur and beyond to Kota and surroundings.

- At Dhaneshwar Toll Plaza, about 50 percent of car traffic is crossing TP03 only (not crossing any other toll plaza of PR). This local traffic is mainly the interactions between the regions of Kota and beyond to/from regions between TP02 and TP03.

### **Freight Traffic:**

- At Bassi (TP01) and Aroli (TP02), 85 percent of freight traffic is found to be through traffic (crossing all 3 toll plazas) and the remaining 15 percent is having local interactions. However, at Dhaneshwar Toll Plaza (TP03) where sand-stone related activities are in vicinity, comparatively higher percent of local freight traffic is found; 73 percent is through traffic and the remaining 27 percent is having local interactions.
- Larger axle trucks (2A, 3A and MAV) crossing all the 3 toll plazas on project road is around 90 percent which are mainly making the trips from Chittorgarh / Udaipur and beyond to Kota and surrounding areas. The other major travel pattern followed by freight traffic on project road is between Gujarat and Uttar Pradesh; Gandhidham / Ahmedabad / Rest of Gujarat to Jhansi / Kanpur / Agra / rest of Uttar Pradesh
- In the case of LCVs, the through traffic is around 80-85 percent and the majority is between Chittorgarh / Udaipur and beyond to Kota and surroundings.
- At Dhaneshwar Toll Plaza (TP03), the local interaction (i.e. traffic not crossing all toll plaza) of freight traffic is significant in number. Almost 44 percent of 2A trucks and 30 percent of 3A trucks are found to have local origin /destination.

The regional distribution as derived from the OD analysis is presented in **Table 3-12**.

States/Mode	Car	M Bus	Bus	MLCV	LCV	2A	3A	MAV
Rajasthan	95.3	95.2	72.7	87.2	70.0	87.2	74.8	67.0
Gujarat	2.3	4.8	19.0	6.5	17.1	7.1	13.4	17.6
Madhya Pradesh	1.4	0.0	1.7	3.8	2.6	0.9	2.0	3.4
Uttar Pradesh	0.6	0.0	5.4	1.3	5.5	2.2	4.0	5.7
Maharashtra	0.1	0.0	0.4	0.2	0.5	0.1	0.1	0.5
Northern Indian States	0.2	0.0	0.6	0.0	0.0	0.2	0.4	0.3
Eastern Indian States	0.1	0.0	0.2	0.7	3.5	2.0	4.8	4.9
North Eastern Indian States	0.0	0.0	0.0	0.0	0.3	0.2	0.4	0.6
Southern Indian States	0.0	0.0	0.0	0.3	0.5	0.1	0.1	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3-6: Normalised Regional Distribution (%) for the PR**

The majority of car traffic at toll plaza locations is from state of Rajasthan (about 92- 97 per cent). The remaining traffic is majorly from Gujarat. Within the state of Rajasthan, the major car traffic generation and attraction points are Chittorgarh, Kota, Udaipur, Bundi and Bhilwara. The major share of bus traffic (including mini buses) plying through the project corridor are primarily within the state of Rajasthan.

Rajasthan accounts for majority of good traffic, followed by Gujarat, Madhya Pradesh and Uttar Pradesh. Eastern Indian states such as West Bengal, Odisha, Chhattisgarh, Jharkhand collectively account for 5 percent of the traffic.

### 3.5 Commodity Distribution

Analysis was also carried out to understand the different commercial vehicles being used to transport different commodities. **Figure 3-2** shows the location of the main sandstone source points and cement industries.



**Figure 3-2: Location of Sandstone Source Points And Cement Industries**

**Table 3-7, Table 3-8** and **Table 3-9** present the commodity-wise share of the total commercial traffic on each of the toll plazas on the project road section.

Commodity Type/ Modes	Mini LCV	LCV	2-Axle	3-Axle	MAV
Food Grains and Cash Crops	5.1	11.3	4.5	8.5	6.8
Fruits & Vegetables	6.6	23.6	2.7	4.0	2.6
Building Materials	0.0	0.0	0.0	0.0	0.3
Iron & Steel Products	0.0	2.8	0.9	0.8	2.4
Petroleum Products, Chemicals and Gas	5.8	8.5	23.4	29.4	8.1
Heavy Machinery & Industrial Equipment	3.6	4.7	0.9	2.0	0.9
Industrial Products & Equipment	3.6	4.7	0.9	6.0	4.0
Consumer Items	4.4	0.0	0.9	1.2	2.1
Automobile and New Chassis	0.7	1.9	2.7	2.0	3.0
Containers	0.0	0.0	0.0	0.0	0.0
Ores & Minerals (Coal, bauxite, limestone)	0.0	0.0	0.0	0.0	1.0
Miscellaneous Items (Parcels, Medicines, Livestock, Forest products, Fertilizers, Milk, etc.)	23.4	17.0	13.5	20.2	16.1
Cement/Fly ash	9.5	4.7	1.8	6.5	24.2
Sand/ Soil	0.0	0.0	0.0	0.8	0.0
Marbles / Tiles	2.2	0.9	0.0	2.0	2.7
Sandstone	2.9	2.8	9.0	4.8	6.6
Empty Vehicles	32.1	17.0	38.7	11.7	19.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-7: Commodity Distribution (in %) at TP01– Bassi Toll Plaza**

Commodity Type/ Modes	Mini LCV	LCV	2-Axle	3-Axle	MAV
Food Grains and Cash Crops	4.7	3.3	2.4	5.1	3.8
Fruits & Vegetables	2.4	7.3	0.8	0.3	0.3
Building Materials	0.8	0.0	3.2	1.9	0.2
Iron & Steel Products	2.4	2.4	0.4	1.9	2.7
Petroleum Products, Chemicals and Gas	2.4	9.8	20.5	16.1	9.5
Heavy Machinery & Industrial Equipment	0.8	0.0	0.4	0.0	0.0
Industrial Products & Equipment	8.7	9.8	0.8	7.7	4.2
Consumer Items	1.6	0.8	0.8	1.9	2.3
Automobile and New Chassis	0.8	1.6	5.2	2.3	2.6
Containers	0.0	0.0	0.0	0.0	0.1
Ores & Minerals (Coal, bauxite, limestone)	0.0	0.0	0.4	0.3	1.8
Miscellaneous Items (Parcels, Medicines, Livestock, Forest products, Fertilizers, Milk, etc.)	21.3	28.5	6.4	17.4	16.3
Cement/Fly ash	0.8	0.8	0.8	5.1	18.0
Sand/ Soil	0.0	0.8	0.8	1.0	3.0
Marbles / Tiles	0.0	0.0	0.0	0.3	0.8
Sandstone	1.6	8.9	28.9	1.6	7.3
Empty Vehicles	52.0	26.0	28.1	37.0	27.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-8: Commodity Distribution (in %) at TP02– Aroli Toll Plaza**

Commodity Type/ Modes	Mini LCV	LCV	2-Axle	3-Axle	MAV
Food Grains and Cash Crops	24.8	14.8	2.1	5.7	8.0
Fruits & Vegetables	4.1	2.5	0.0	0.0	1.4
Building Materials	0.0	0.0	8.0	15.6	1.7
Iron & Steel Products	0.8	2.5	0.7	1.5	4.1
Petroleum Products, Chemicals and Gas	1.7	11.1	12.8	24.3	10.1
Heavy Machinery & Industrial Equipment	0.8	1.2	0.0	0.6	0.3
Industrial Products & Equipment	2.5	6.2	1.7	3.0	3.1
Consumer Items	0.0	0.0	0.3	0.0	0.2
Automobile and New Chassis	0.0	0.0	0.0	0.0	0.0
Containers	0.0	0.0	0.3	0.0	1.3
Ores & Minerals (Coal, bauxite, limestone)	0.8	0.0	0.3	0.0	1.4
Miscellaneous Items (Parcels, Medicines, Livestock, Forest products, Fertilizers, Milk, etc.)	21.5	19.8	9.7	8.4	8.8
Cement/Fly ash	2.5	3.7	3.5	4.5	19.8
Sand/ Soil	0.0	0.0	0.3	0.0	0.0
Marbles / Tiles	0.0	0.0	0.7	0.0	2.0
Sandstone	0.8	7.4	24.6	7.8	6.8
Empty Vehicles	39.7	30.9	34.9	28.5	31.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-9: Commodity Distribution (in %) at TP03– Dhaneshwar Toll Plaza**

- Sandstone is the major commodity being transported in 2A/3A/MAV trucks vehicles (except MLCV) on the project road. Kota-Chittorgarh and Kota- rest of Rajasthan / Northern Indian states are the two major interactions observed. Notably, sandstone mines in Dhaneshwar and Dabi area are the major source of

sandstone in the vicinity of TP03 (Dhaneshwar TP). Around 400 mines, small and large mines, are presently working in the region which is generating around 250 trucks/day of sandstone. During monsoon period (April – November), operating mines generate around 175-190 trucks per day.

- Cement and fly ash are other major commodities being transported in 2A/3A/MAV trucks vehicles (except MLCV) across all toll plazas. Almost 200 freight vehicles carrying cement from the factories situated in Lakheri, Kota, Nimbahera, Neemuch are using the project road. Thermal Power Plant in Kota is major source of fly ash, which is being transported to cement factories located in Lakheri, Nimbahera, Udaipur and Chittorgarh.
- Miscellaneous products particularly parcels, powder, parchune and petroleum products such as diesel, petrol, kerosene, oil, grease, bitumen, gas cylinders were observed across toll plaza locations in all the freight modes.

### **3.6 Project Road Traffic**

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

#### **3.6.1 Normal Traffic**

Normal traffic is the traffic which is already plying on the project road as assessed in Table 3-2.

#### **3.6.2 Diverted Traffic**

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In context of the project road, there are no routes in vicinity of toll plazas to avoid the project road. The development of the under-construction green-field Delhi-Mumbai Expressway (DME) may impact the project road traffic.

#### **Delhi – Mumbai Expressway**

Delhi–Mumbai Expressway (DME) is an under-construction 1,296 km long controlled-access highway connecting the national capital Delhi with India's commercial capital Mumbai. The expressway is proposed on a greenfield-alignment and will be a 12-lane facility (6 lanes in each direction). Being a signal-free access-controlled corridor



between the two cities running across five states will cut down the travel time from 25 hours to 12 hours.

This Expressway was first announced in April 2018 by Union Minister Nitin Gadkari and as per the latest update, it is targeted to be completed by January 2023. Around 18 packages out of 50 packages are already under construction, and tenders for several route sections are being awarded and under various stages of implementation as per latest NHAI update.

The alignment of proposed Delhi – Mumbai Expressway is parallel to the project section and it passes through the states of Haryana (80km), Rajasthan (375km), Madhya Pradesh (245km), Gujarat (425 km) and Maharashtra (170km). The alignment of Delhi-Mumbai Expressway is presented in **Figure 3-3**.



**Figure 3-3: Alignment of Delhi-Mumbai Expressway**

The assessment of any likely traffic addition to/diversion away from the Project Road (PR) has been done using the cost ratio analysis as described below:

- Assessment of the potential divertible traffic sensitive to network improvements based on the observed travel pattern
- Calculation of road user cost of travelling on the project road and the alternative route. The road user cost includes vehicle operating cost (VOC), travel time cost (TTC) and toll cost (TC), if any.

The road user cost is estimated based on vehicle operating cost equations presented in Updation of Road User Cost Study (RUCS) carried out by Central Road Research Institute in 2009 for Ministry of Road Transport and Highways. Using the likely traffic stream speeds and lane configuration, the vehicle operating, and travel time costs are estimated for each of the routes. Road user cost on the identified routes is calculated and diversion percentages are estimated using diversion curve method mainly for trucks. In this method, traffic likely to be diverted from/to the project road, was estimated using Logit model, which computes expected diversion percentage based on the ratio of perceived cost on the existing and proposed facilities. The perceived cost is the financial vehicle operating cost and the time saving cost including toll charges (if any). According to the model, a vehicle will shift if the perceived cost on an alternative route is lower in comparison to existing route. The diversion equations for estimating diversion have been adopted from IRC 108:2015. These equations are presented in **Table 3-10**.

Vehicle	Cost Ratio (CR) Interval	Equations
Car	$\leq 0.634$	$\% \text{ Div.} = 98.750 - (CR/0.634) * 8.125$
	$0.634 \leq CR \leq 1.465$	$\% \text{ Div.} = 90.625 - ((CR-0.634)/0.831) * 84.375$
	$1.465 \leq CR \leq 2.0$	$\% \text{ Div.} = 6.25 - ((CR-1.465)/0.535) * 5.25$
Truck & Bus	$\leq 0.750$	$\% \text{ Div.} = 100 - ((CR/0.75) * 5)$
	$0.750 \leq CR \leq 1.250$	$\% \text{ Div.} = 95 - ((CR-0.75)/0.5) * 90$
	$1.250 \leq CR \leq 2.0$	$\% \text{ Div.} = ((2-CR)/0.75) * 5$

**Source: IRC 108-2015**

**Table 3-10: Diversion Equations Used for Analysis**

The diversion percentages are estimated for the future conditions keeping in view, the updated project road network and surrounding road network. The diversion percentages are then applied to the potential divertible traffic/corridor by OD pair to calculate the traffic that would divert to/from the project road.

The diversion analysis considers the toll rates for DME section (I-H-G-F) as 1.5 times of the normal NHAI per km toll rates (accounting for 1.25 times for normal length of expressway and increase for the likely equivalent structure length).

The estimation of diversion away or to project road has been done for two streams of traffic.

- Diversion away from PR for the traffic plying between Gandhidham/Ahmedabad/rest of Gujarat to Kota & beyond
- Diversion to PR for the traffic plying between Haryana/Delhi & beyond to Chittorgarh/Udaipur & surroundings currently using the route via Delhi-Jaipur-Kishangarh-Chittorgarh (NH8/NH76/NH79A)

### **Diversion away from Project Road**

After the construction of Delhi-Mumbai Expressway (DME), traffic plying between Gandhidham /Ahmedabad/rest of Gujarat to Kota & beyond (towards Jhansi/Lucknow/Kanpur) currently on PR will have an option to continue travelling on the route via project road and using Chittorgarh-Ahmedabad section of NH8 (I-E-F) or the route via greenfield DME (I-H-G-F). The route via I-E-F is about 515 km as against 517 km via I-H-G-F. Once DME is completed, some of the freight vehicles currently using the project road may find section via DME (I-H-G-F) attractive and may divert away from the project road due to the travel distance being similar for the two routes.

### **Diversion to Project Road**

The traffic plying between Haryana/Delhi & beyond to Chittorgarh/Udaipur & surroundings currently plying on Delhi-Jaipur-Kishangarh-Chittorgarh (A-B-C-D-E) will have an option to travel via A-J-I-E (combination of DME and Project road). The route via A-J-I-E is about 550 km as against 526 km via A-B-C-D-E. Once the section A-J-I is complete, some of the freight vehicles using A-B-C-D-E may divert from the alternate route via Jaipur-Kishangarh to the route via project road (A-J-I-E).

### **Net Gain or Loss to Project Road**

The assessment for traffic stream between Gandhidham / Ahmedabad/ rest of Gujarat to Kota & beyond (towards Jhansi/Lucknow/Kanpur) has been derived from the OD's of the project road conducted earlier as available with the consultant.

The traffic stream between Haryana/Delhi & beyond to Chittorgarh/Udaipur & surroundings as derived from the OD surveys conducted on Kishangarh-Udaipur section as available with the consultant.

The estimated diversion for freight vehicles away/ to the project road based on the route choice analysis is presented in **Table 3-11**.

Modes	3A	MAV
<b>Loss to PR</b>		
Potential traffic stream	10	261
Future Project Road share (%) from diversion equations	55.7	55.6
Adopted Future Project Road share (%)	50.0	50.0
Expected loss from PR (A)	5	131
<b>Gain to PR</b>		
Potential traffic stream	288	706
Future Project Road share (%) from diversion equations	37.04	34.67
Adopted Future Project Road share (%)	25.0	25.0
Expected Gain to PR (B)	72	177
<b>Net gain to the PR</b>		
Net Gain to PR (B-A)	67	46

**Table 3-11: Impact of Delhi-Mumbai Expressway**

The cost-ratio based analysis indicates a project road share of around 55 percent once DME is operation. Similarly, with respect to the loss from KUA route, the equations indicate that around 37 percent of the potential traffic streams should be on Project road.

In view of the uncertainty regarding exact tolling lengths to be travelled (including equivalent structure length) on DME, a conservative approach of a higher loss and lower gain has been adopted for further analysis.

The development of the Delhi-Mumbai Expressway is expected to result in a gain of about 67-3A and 46-MAVs. This diversion (gain) to the route via DME and PR has been considered as an upside scenario.

As DME is likely to be operational in FY24 and in view of a slow built of traffic on DME, 50 percent of the expected gain due to DME operation has been considered in FY24 and 75 percent for FY25 increasing to 100 percent from FY26 onwards.

### **3.6.3 Induced/ Development traffic**

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km or highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border areas and far flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Rajasthan. The economic corridors planned in this state are Sri Ganganagar- Samakhialyali, Agra-Indore and Jaipur-Udaipur and is likely to improve connectivity with an aim to provide quicker movement of cargo. **Figure 3-4** presents the details of the upcoming projects under Bharatmala in the project influence area in the context of the project section.



**Figure 3-4: Alignment of the Economic Corridors and Feeder Roads**

As the project road caters to the long/ short distance traffic, it is likely to have a potential for growth in view of the developments of these economic corridors and feeder roads. This project section being a part of 4 laned tolled East-West Corridor, will continue to remain an important highway for the East-West movement especially Kanpur & beyond to Udaipur & beyond and may see sustained growth in the future. The travel pattern signifies that around 90 percent of the larger axle trucks (2A, 3A and MAV) are crossing all the 3 toll plazas on project road which are mainly making the trips from Chittorgarh / Udaipur and beyond to Kota and surrounding areas.

### 3.7 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 1996. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$$\text{Log}_e(P) = A_0 + A_1 \text{Log}_e(EI), \text{ where:}$$



P	- Traffic Volume
EI	- Economic Indicator
A0	- Regression Constant
A1	- Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.
- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till 2050.

### 3.8 Identification of PIA States

The regional distribution based on travel pattern shows that Rajasthan and Gujarat are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Madhya Pradesh and Uttar Pradesh also contribute to the project road traffic in addition to the states of Rajasthan and Gujarat.

Looking at the predominance of Rajasthan and Gujarat in cars and buses, these states have been adopted as the PIA states for passenger vehicles. In case of freight vehicles, Rajasthan Gujarat, Madhya Pradesh and Uttar Pradesh have been adopted as the PIA states. The normalized regional distribution for different modes is presented in **Table 3-12**.

States/Mode	Car/ML CV	LCV/M Bus	Bus	Truck	3A	MAV
Rajasthan	96.6	75.6	79.3	89.6	79.4	71.6
Gujarat	3.4	16.6	20.7	7.3	14.2	18.8
Madhya Pradesh	0.0	2.5	0.0	0.9	2.1	3.6
Uttar Pradesh	0.0	5.3	0.0	2.2	4.2	5.9
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-12: Normalised Regional Distribution (%) for the PR**

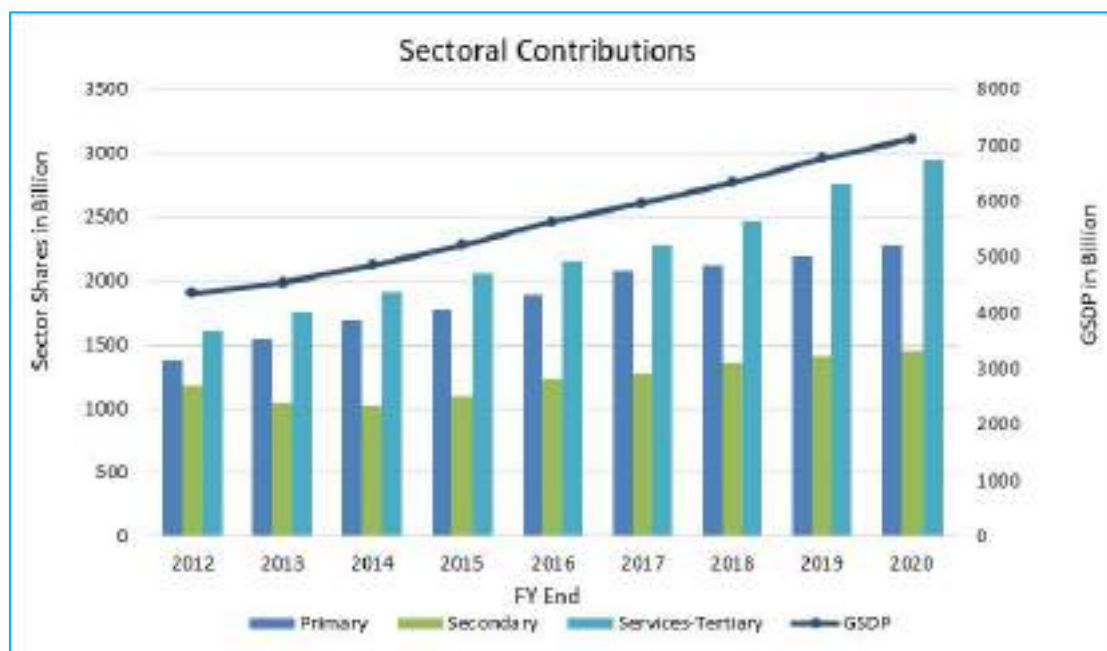
The regional distribution shows that Rajasthan and Gujarat are the main contributors of traffic on the project road in case of passenger vehicles. In addition to Rajasthan and Gujarat, the states of Madhya Pradesh and Uttar Pradesh also contribute to the truck traffic. Around 71-80 percent is being contributed by Rajasthan in 3A and MAV trucks while Gujarat has a share of around 14 to 18 percent. Around 2 to 6 percent is being contributed by Madhya Pradesh and Uttar Pradesh in these categories of trucks.

### 3.9 Past Economic Growth of PIA

Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

- Rajasthan's Gross State Domestic Product (GSDP) stood at Rs 7,116 billion in 2019-20 and has been growing at a compounded annual growth rate of 6.6 per cent since 2011-12.
- The state's growth has been around 5-8 per cent since FY14. The recent year of FY20 have shown a growth of around 5.0 per cent.
- The services (tertiary) sector is the largest contributor to GSDP (44 percent), followed by agriculture allied activities sector at 34.1 percent, industry (secondary) sector has a share of 21.7 percent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-5**.



**Figure 3-5: GSDP (in Rs billion) and its Sectoral Composition for Rajasthan**

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-13**.

Particulars/ Slabs	2011-12 to 2019 -20	2014-15 to 2019-20
GSDP	6.6	6.4
Agriculture and Allied	6.3	5.0
Industry	4.2	5.4
Services	7.6	7.8
Construction	2.1	2.7
Per Capita Income	5.1	4.9

**Table 3-13: Average Annual Growth Rates (%) of State Income for Rajasthan**

Rajasthan is also famous for its tourist attractions spread all across the state. The number of total tourists (domestic and international) has increased from 26.82 million in 2010 to 53.82 million in 2019 representing a growth of 8 percent per annum.

Rajasthan is known for its textile industry and the state is the fourth largest producer of spun yarn in India. The main industries of Rajasthan include textile, rugs, woollen goods, vegetable oil and dyes. Heavy industries consist of copper and zinc smelting and the manufacture of railway rolling stock. The other industries related to private sector include steel, cement, ceramics and glass wares, electronic, leather and footwear, stone and other chemical industries.

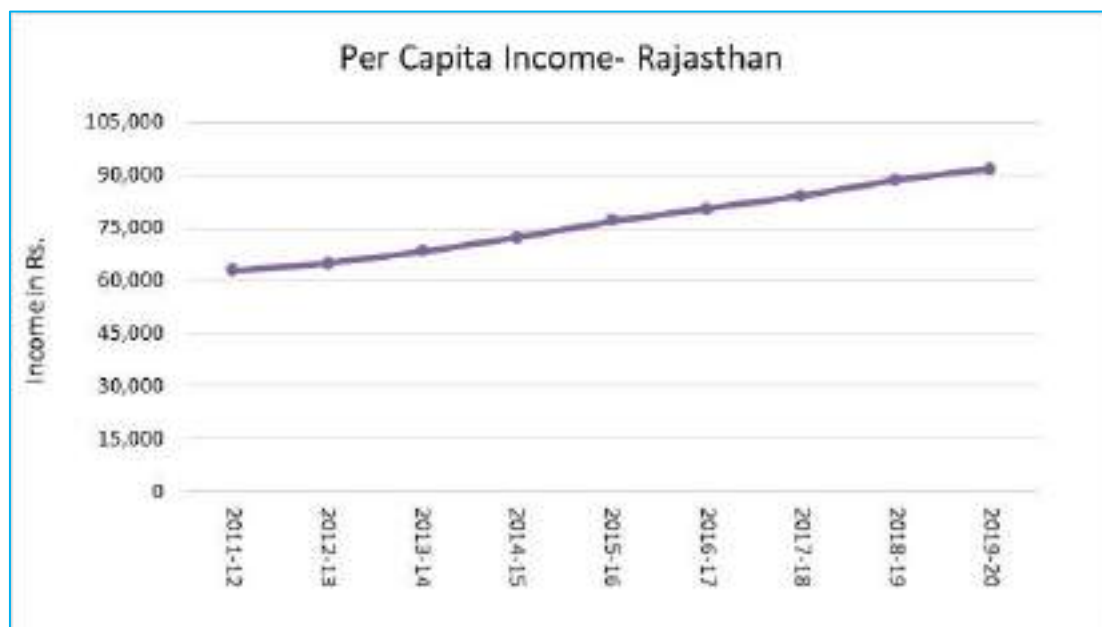
Rajasthan has huge reserves of cement-grade and Steel Melting-Shop (SMS) grade limestone. SMS-grade limestone from Jaisalmer is supplied to various steel plants in the country. Rajasthan has 21 major cement plants, having a total capacity of 55 million tonnes per annum (MTPA). It is the largest cement-producing state in India. The state has about 17 per cent share in cement grade limestone reserves of India. Given the availability of huge cement grade limestone reserves, more than 10 cement plants would

be installed in the state in near future, particularly in Chittorgarh, Jaipur, Jhunjhunu, Nagaur and Pali.

The state is a leading producer of major minerals such as lead-zinc, calcite, gypsum, rock phosphate, ochre, silver as well as minor minerals such as marble, sandstone, serpentine (green marble), etc. which contribute a major percentage to national production.

The state is developing sector specific infrastructure, such as special purpose industrial parks and special economic zones (SEZs) for exports of handicrafts, IT and electronic goods. Eight SEZs have got formal approval and eight have been notified. The primary industries for these SEZs are IT/ITES, Handicrafts, Gems and Jewellery, Engineering and related services.

Per Capita Income of Rajasthan is Rs 91,794 in the year 2019-20 and has been growing at 5.1 percent during 2011-12 to 2019-20. The growth in Per Capita Income is presented in **Figure 3-6**.



**Figure 3-6: Per Capita Income of Rajasthan from 2011-12 to 2018-19**

#### **Other PIA States**

The other PIA states contributing to the traffic on the project road are Gujarat, Madhya Pradesh and Uttar Pradesh.

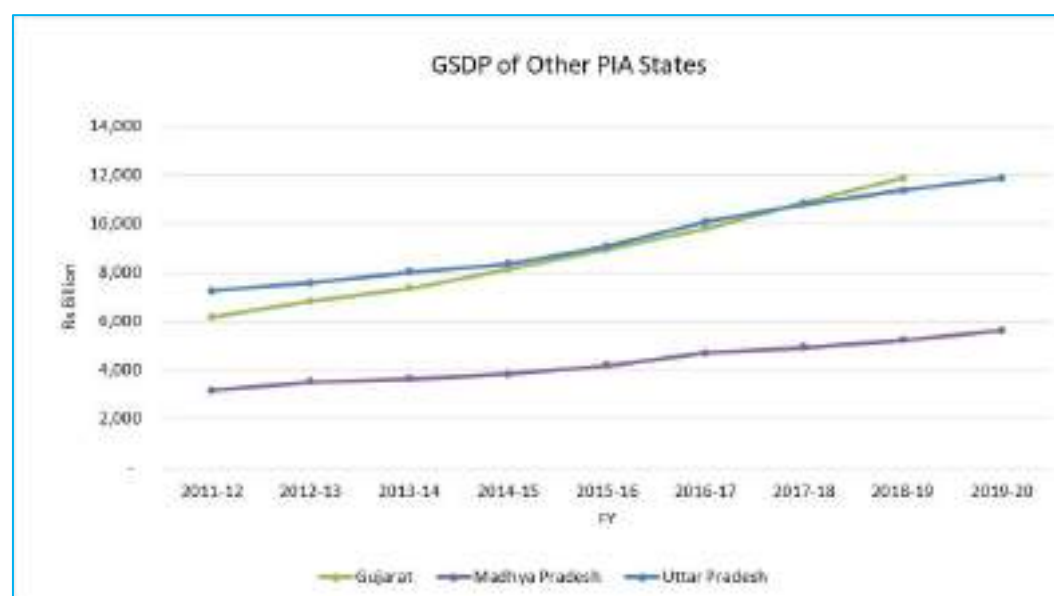
- Gujarat's Gross State Domestic Product (GSDP) stood at Rs 11,863 billion in 2018-19 and has been growing at a compounded annual growth rate of 9.8 percent since 2011-12.
- Madhya Pradesh's Gross State Domestic Product (GSDP) is reported to be Rs 5,618 billion in FY20 with an annual growth rate of 8.7 percent since FY12.
- Uttar Pradesh's GSDP is around Rs 11,872 billion and has been growing at 6.9 percent since FY12.

- The services sector is the largest contributor to GSDP of the PIA states, 35.9 percent in Gujarat, 41 percent in Madhya Pradesh and 48.7 percent in Uttar Pradesh. The average annual growth rates as obtained using regression analysis till the last available year (FY12-FY19/FY20) are presented in **Table 3-14**.

Particular/ States	Gujarat	Madhya Pradesh	Uttar Pradesh
GSDP	9.8	8.7	6.9
Primary	6.8	7.8	3.9
Secondary	11.2	7.2	8.8
Tertiary	8.4	8.6	7.3
Construction	3.1	4.2	4.9
Per Capita Income	8.2	6.8	5.2

**Table 3-14: Average Annual Growth Rates (%) of State Income for other PIA states**

The GSDP over the years for the states of Gujarat, Madhya Pradesh and Uttar Pradesh are presented in **Figure 3-7**.



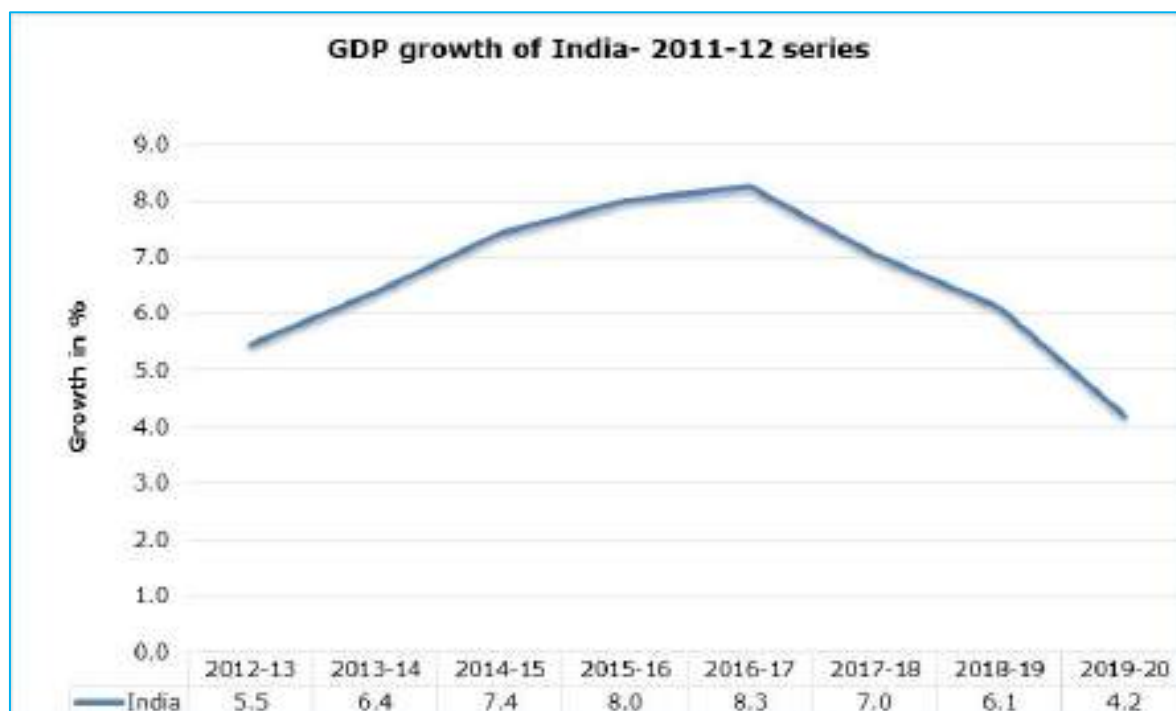
**Figure 3-7: GSDP (in Rs billion) for Other PIA States**

### 3.10 India and PIA Outlook

#### 3.10.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-8**.





**Figure 3-8: GDP growth in India**

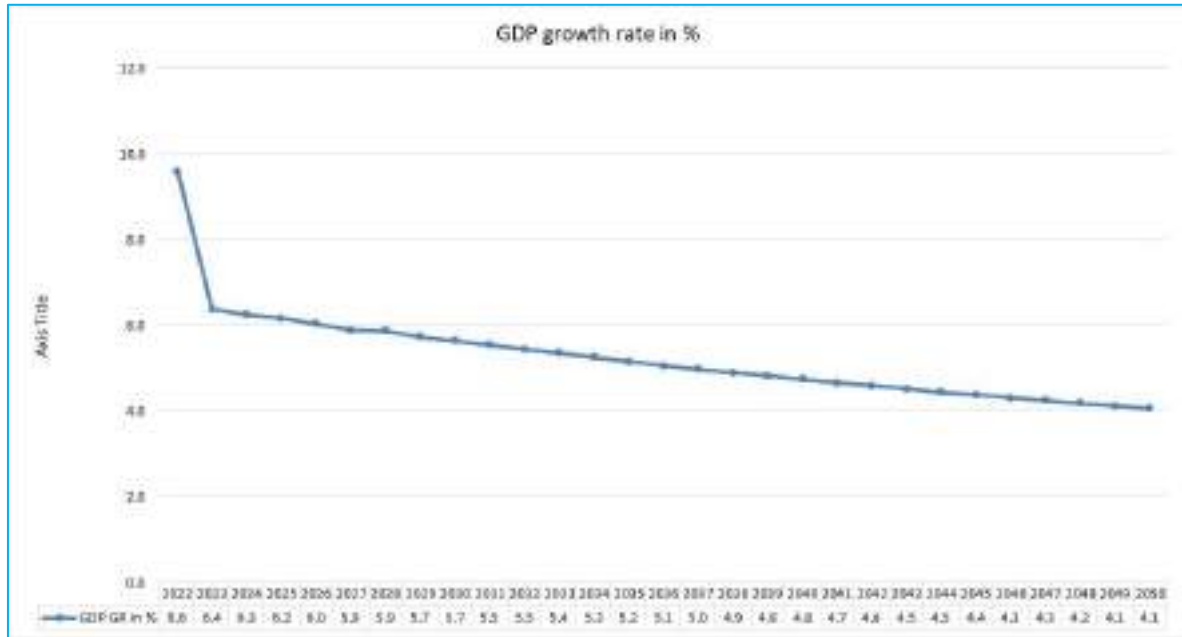
Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third quarter grew by 0.4 percent. The forecast for next quarter is expected to be positive with economic activities picking up. The resultant contraction for FY21 is expected to be around 7 to 8 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. ICRA, Moody and SBI have recently predicted a growth of around -9 to -11 percent for FY21. S&P has predicted -7 percent for FY21 and a strong revival in FY22 with a likely growth of 10 percent. The forecast by IMF on January 26, 2021 for FY21 is -8 percent, 11 percent for FY22 and 6.8 percent for FY23. World Bank on October 9, 2020 has forecasted a growth of around -9.6 percent for FY21 and 5.4 percent for FY22. As per ADB's latest update (December 20), India's GDP is expected to grow by -8 percent in 2021 and 8 percent in FY22. Organisation for Economic Cooperation and Development (OECD) has forecasted the GDP growth to be around -7.4 percent in FY21

and 12.6 percent for FY22. As per latest Economic Survey of India, the economy is predicted to have a growth rate of 10-12 percent for FY22, 6.5 percent in FY23 and 7 percent in FY24.

In light of the outlook being predicted by various agencies for the current years and likely revival thereafter spread over a couple of years, the year on year growth for Indian economy has been adopted from Consensus Economics forecast till 2050 and presented in **Figure 3-8**.



**Figure 3-9: GDP Forecast of India by Consensus Economics**

### 3.10.2 PIA States Outlook

A snapshot of the main economic indicators in the past and the growth adopted for future for the PIA state is presented in **Table 3-15**.

Indicators/Stares	Rajasthan	Gujarat	Madhya Pradesh	Uttar Pradesh
GSDP in Rs Billion	7,116	11,864	5,618	11,873
GSDP growth (2011/12 to last year) in %	6.6	9.8	8.7	6.9
Per capita Income in Rs (FY20)	91,794	175,630	67,770	52,154
Sectoral shares in last available year (%)				
Agriculture and allied	34.1	17.1	34.9	22.6
Industry	21.7	47.0	24.1	28.7
Services	44.1	35.9	41.0	48.7

**Table 3-15: Main Economic Indicators of PIA States**

Income estimates are available till FY20 for all the PIA states except Gujarat. The income growth of PIA states of Gujarat as observed in the past years (FY12 to FY19) is assumed to continue for FY20. In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. A reality check is done in the background as to whether adoption of these applicable growth rates for all the states of India lead to achieving the overall target set for India as a whole. The adopted multipliers along with

the implied Indian economy/ PIA states' outlook under different time periods are presented in **Table 3-16**.

Period	India	Rajasthan	Gujarat	Madhya Pradesh	Uttar Pradesh
<b>Past growth %</b>					
2011-12 to 2019-20	7.0	6.6	9.8	7.5	6.9
2014-15 to 2019-20	7.0	6.4	10.0	8.1	7.4
<b>Past Multipliers vis-a-vis India</b>					
2011-12 to 2019-20		0.94	1.40	1.07	0.98
2014-15 to 2019-20		0.92	1.44	1.16	1.07
<b>Multipliers adopted for future</b>					
States w.r.t. India		0.90	1.20	1.10	0.90

**Table 3-16: Past Multipliers and Future Outlook of PIA States**

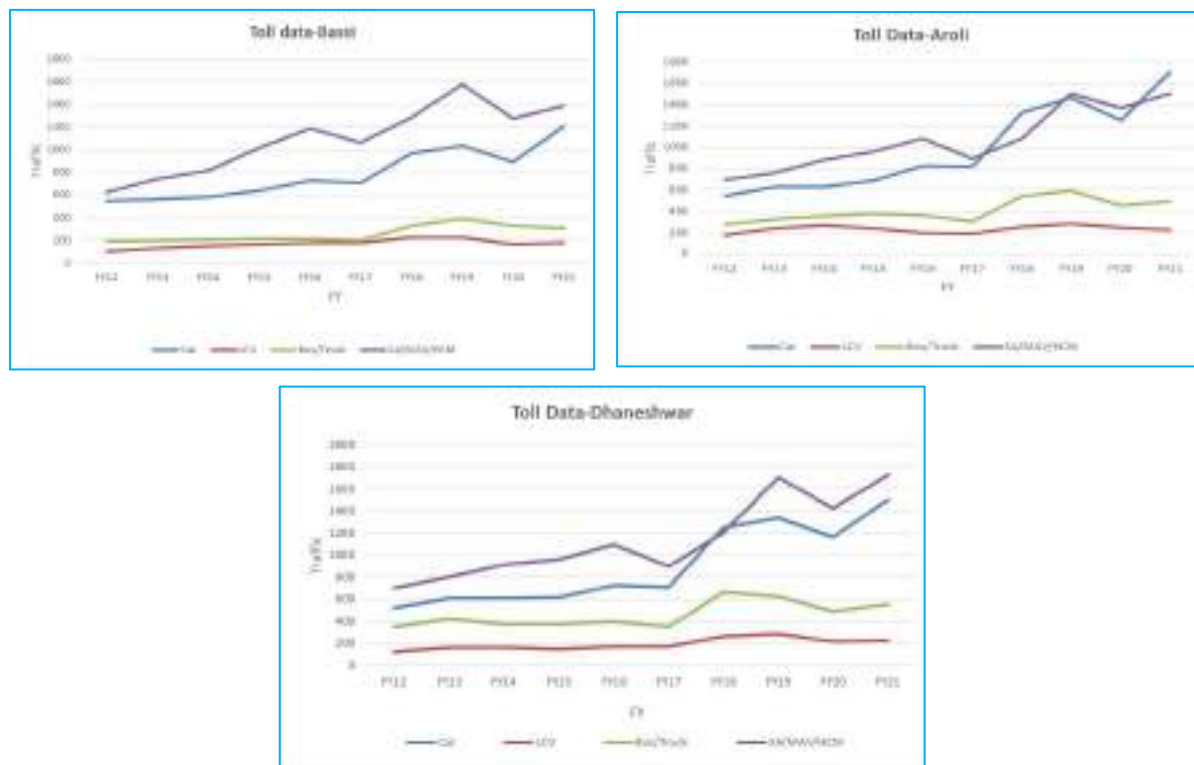
Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income is presented in **Table 3-17**.

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2022	8.82	9.42	9.57	9.01	9.33	9.52
2023	5.86	6.27	6.37	5.99	6.20	6.33
2024	5.75	6.14	6.24	5.88	6.08	6.21
2025	5.67	6.06	6.15	5.79	5.99	6.12
2026	5.55	5.93	6.02	5.67	5.87	5.99
2027	5.42	5.79	5.88	5.54	5.73	5.85
2028	5.40	5.77	5.86	5.52	5.71	5.83
2029	5.27	5.63	5.72	5.39	5.57	5.69
2030	5.19	5.55	5.64	5.31	5.49	5.61
2031	5.10	5.45	5.53	5.21	5.39	5.50
2032	5.01	5.35	5.43	5.12	5.30	5.41
2033	4.93	5.26	5.35	5.04	5.21	5.32
2034	4.84	5.18	5.26	4.95	5.12	5.23
2035	4.74	5.07	5.15	4.85	5.02	5.12
2036	4.66	4.98	5.06	4.76	4.93	5.03
2037	4.58	4.89	4.97	4.68	4.84	4.94
2038	4.51	4.82	4.89	4.61	4.77	4.87
2039	4.44	4.74	4.82	4.54	4.69	4.79
2040	4.37	4.67	4.74	4.47	4.62	4.72
2041	4.29	4.59	4.66	4.39	4.54	4.64
2042	4.22	4.51	4.59	4.32	4.47	4.56
2043	4.16	4.44	4.51	4.25	4.40	4.49
2044	4.09	4.37	4.44	4.18	4.32	4.41
2045	4.03	4.31	4.37	4.12	4.26	4.35
2046	3.97	4.24	4.31	4.06	4.20	4.29
2047	3.91	4.18	4.24	4.00	4.14	4.22
2048	3.85	4.11	4.18	3.94	4.07	4.16
2049	3.79	4.05	4.12	3.88	4.01	4.09
2050	3.73	3.99	4.06	3.82	3.95	4.03

**Table 3-17: Future Mode-wise Weighted Income of PIA States**

### 3.11 Review of Past Traffic Data

Past traffic data was available for the toll plaza locations and a comparison of the year on year traffic at the toll plazas is presented in **Figure 3-10**.



**Figure 3-10: Traffic Profile of Toll Plaza Data**

The end point growth at the three toll plazas is presented in **Table 3-18**.

FY/Mode	Car	LCV	Bus/2A	3A/MAV
<b>End point growth in %</b>				
<b>Bassi Toll Plaza</b>				
FY20 vs FY12	6.3	6.5	7.0	9.4
FY20 vs FY16	7.0	0.6	9.6	4.7
<b>Aroli Toll Plaza</b>				
FY20 vs FY12	11.1	4.4	6.5	8.9
FY20 vs FY16	12.9	0.9	3.8	7.3
<b>Dhaneshwar Toll Plaza</b>				
FY20 vs FY12	10.6	7.3	4.4	9.2
FY20 vs FY16	13.5	7.3	5.5	8.3

**Table 3-18: Past Traffic Growth at the Three Toll Plazas**

The comparison of the past data shows a double-digit growth in cars between FY12 and FY20 at Aroli and Dhaneshwar toll plazas and 6 percent at Bassi toll plaza. LCVs have shown a 4-7 growth in the long term at the three toll plazas. The growth in Bus/2A trucks has been 4-7 percent in FY12 and FY20 comparison. MAVs have shown a positive and high growth in the past. Although the end point comparisons show a reasonably good growth trend but there is high year on year variation observed at all the three toll plazas.

The traffic data from IHMCL count stations is available for eight months between FY16 and FY21. The counts have been classified into respective financial years and converted

into AADT by applying SCF from the average of FY15 to FY19 of the respective toll plaza's data. The end point growths from IHMCL AADT is presented in **Table 3-19**.

FY/Mode	Car	LCV	Bus/2A	3A/MAV
<b>End point growth in %</b>				
<b>Bassi Toll Plaza</b>				
FY21 vs FY16	7.4	4.1	2.3	-0.8
FY21 vs FY18	13.0	1.6	-1.0	-6.0
<b>Aroli Toll Plaza</b>				
FY21 vs FY16	13.4	7.9	-11.1	4.8
FY21 vs FY18	6.8	10.3	-12.2	6.4
<b>Dhaneshwar Toll Plaza</b>				
FY21 vs FY16	9.9	2.3	-0.2	9.4
FY21 vs FY19	3.8	-19.2	-18.1	11.7

**Table 3-19: Past Traffic Comparison from IHMCL AADT**

The IHMCL AADT shows a 7-13 percent growth between FY18/FY19 and FY21. LCV growth is between 4-10 percent across the three plazas between FY16 and FY21 comparison. Bus/Truck has shown a negative growth across all the plazas (FY18-FY21). 3A/MAV have also shown a good growth at Aroli and Dhaneshwar plazas. There is year on year variation across all the three plazas.

The comparison of the counts of Avanza study of FY18 and FY21 is presented in **Table 3-20**.

TP/Mode	Car	LCV	Bus/2A	3A/MAV
<b>Avanza counts of FY18 (Nov 18)</b>				
TP01 -Bassi	1,647	304	386	1,590
TP02 – Aroli	2,017	342	558	1,500
TP03- Dhaneshwar	2,229	377	768	1,546
<b>Avanza counts of FY21 (Feb 21)</b>				
TP01 -Bassi	2,199	347	367	1,595
TP02 – Aroli	2,620	343	542	1,842
TP03- Dhaneshwar	2,673	474	630	1,906
<b>CAGR (%)</b>				
TP01 -Bassi	10.1	4.5	-1.6	0.1
TP02 – Aroli	9.1	0.1	-1.0	7.1
TP03- Dhaneshwar	6.2	8.0	-6.4	7.2

**Table 3-20: Avanza counts of FY18 vs FY21**

The comparison of two sets of counts show around 6-10 percent growth in cars at all the three toll plazas and around 7 percent growth in MAV trucks at TP02 and TP03.

### 3.12 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines. The elasticity by vehicle types have been estimated based on the regression analysis of weighted income of PIA states with the actual traffic data.

A regression between weighted GSDP (as independent variable) and weighted registered vehicles (as dependant variable) of PIA states was carried out. The registered vehicle elasticity in case of cars is 1.5 during FY12 to FY17. In case of all trucks combined, the registered vehicle elasticity is 1.2 during the same period. For buses, an elasticity of 0.7 has been derived for FY12 to FY17 period.



Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such as vehicles taken off the road due to lack of road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road.

The past elasticity values from the past toll data have been presented in **Table 3-21**.

FY/Mode	Car	LCV	Truck/Bus	3A/MAV
<b>Bassi Toll Plaza</b>				
FY20 vs FY12	1.25	1.19	1.30	1.56
FY20 vs FY16	1.31	0.20	2.53	0.92
<b>Aroli Toll plaza</b>				
FY20 vs FY12	1.93	0.38	1.14	1.30
FY20 vs FY16	2.36	1.47	1.90	1.64
<b>Dhaneshwar Toll plaza</b>				
FY20 vs FY12	1.81	1.28	0.92	1.41
FY20 vs FY16	2.62	1.69	1.67	1.96

**Table 3-21: Past Elasticities from Toll Data**

High elasticity values have been observed in past toll data for almost all the modes in long term as well as short term comparisons.

The past elasticity values from IHMCL data have been presented in **Table 3-22**.

FY/Mode	Car	LCV	Truck/Bus	3A/MAV
<b>Bassi Toll Plaza</b>				
FY21 vs FY16	1.2	0.6	0.4	-0.1
FY21 vs FY18	2.2	0.2	-0.2	-0.9
<b>Aroli Toll plaza</b>				
FY21 vs FY16	2.2	1.1	-1.7	0.7
FY21 vs FY18	1.2	1.6	-1.9	1.0
<b>Dhaneshwar Toll plaza</b>				
FY21 vs FY16	1.6	0.3	0.0	1.4
FY21 vs FY19	0.6	-2.9	-2.9	1.7

**Table 3-22: Past Elasticities from IHMCL Data**

## **Cars**

- In case of cars, the elasticity values derived from toll data and IHMCL data are more than 1.0. TP01 and TP03 have shown an elasticity of 1.2 and 1.6 between FY16 and FY21 in IHMCL data but TP02 shows exorbitantly high elasticity during the same period. In case of the different packages of Jaipur-Kishangarh-Ajmer-Pali-Pindwara, the car elasticity values have been in the range of 1.0 to 1.3. The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development. Car elasticity has been considered as 1.1 for the period up to FY30 and tapered to 1.0 for the rest of years till 2050 in view of the tourism activities in the region and presence of educational hub in Kota.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per 1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.
- It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 and further tapering has been done in the next slab.

## **Bus/Truck**

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.7 across the operational National Highways.

- The IHMCL data shows a past elasticity of 0.4 in FY16 to FY21 comparison of TP01 in combined Bus/Truck category. Going forward Bus and Truck elasticity has been recommended as 0.5 till 2050.

## **Trucks**

- For smaller axle trucks like MLCV/LCV, a higher elasticity value of 0.7 has been adopted till 2050. The elasticity values in the past have been in the range of 0.6 to 1.1 at TP01 and TP02 during the period of FY16 to FY21. MLCVs are being charged here in LCV category, however, the switch between MLCV and LCV is being observed across other national highways wherein MLCVs have been gaining importance lately over LCV category.
- The project road toll plaza data for 3A/MAV has shown an elasticity of 0.9 in FY16 and FY20 comparison at TP01 whereas other two toll plazas show an elasticity value of more than 1.0. From IHMCL counts, an elasticity of 0.7 has been observed at TP02 in FY16 vs FY21 comparison. For 3A/MAV category, an elasticity of 0.7 has been adopted for 3A trucks and 1.0 for MAV trucks till FY30 indicating a combined elasticity of 0.9 for 3A/MAV.

It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 for Cars, LCV & MAV and further tapering has been done in the next slab.

In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement and some of the 2A trucks are still being used for local movements.

The changing trend is clearly visible in the sales of trucks. Demand for the traditional 16T and 25T rigid trucks is declining while segments like 31T and 37T rigid trucks and 35T, 40T and 49T tractor-trailers are gaining major traction. In fact, the 37T multi-axle rigid truck segment is one of the fastest growing segments in HCVs.

As per SIAM, LCV goods carrier have shown a growth of 25 percent in FY17 to FY19 and M&HCV rigid/ trailer trucks witnessed a growth of around 17 percent during the same period. However, all the vehicles have shown a double-digit negative growth in FY20 due to the economic slowdown, COVID 19 and technology disruption in the form of compliance to Bharat Stage VI norms etc.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-23**.

FY/Modes	Car/MLCV	LCV/Mini Bus	Bus	Truck	3A	MAV
FY22	1.1	0.7	0.5	0.5	0.7	1.0
FY23-FY25	1.1	0.7	0.5	0.5	0.7	1.0
FY26-FY30	1.1	0.7	0.5	0.5	0.7	1.0
FY31-FY35	1.0	0.7	0.5	0.5	0.7	0.9
Beyond FY35	1.0	0.7	0.5	0.5	0.7	0.9

**Table 3-23: Recommended Elasticity for Project Road**

### 3.13 Projected Traffic Growth Rates

Based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

$Tgr = (GSDPgr) \times E$ ; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year on year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY50. The estimated traffic growth rates for the project road have been presented in **Table 3-24**.

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2022	9.7	6.6	4.8	4.5	6.5	9.5
2023	6.4	4.4	3.2	3.0	4.3	6.3
2024	6.3	4.3	3.1	2.9	4.3	6.2
2025	6.2	4.2	3.1	2.9	4.2	6.1
2026	6.1	4.2	3.0	2.8	4.1	6.0
2027	6.0	4.1	2.9	2.8	4.0	5.8
2028	5.9	4.0	2.9	2.8	4.0	5.8
2029	5.8	3.9	2.9	2.7	3.9	5.7
2030	5.7	3.9	2.8	2.7	3.8	5.6
2031	5.1	3.8	2.8	2.6	3.8	5.0
2032	5.0	3.7	2.7	2.6	3.7	4.9

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2033	4.9	3.7	2.7	2.5	3.6	4.8
2034	4.8	3.6	2.6	2.5	3.6	4.7
2035	4.7	3.5	2.6	2.4	3.5	4.6
2036	4.7	3.5	2.5	2.4	3.4	4.5
2037	4.6	3.4	2.5	2.3	3.4	4.4
2038	4.5	3.4	2.4	2.3	3.3	4.4
2039	4.4	3.3	2.4	2.3	3.3	4.3
2040	4.4	3.3	2.4	2.2	3.2	4.2
2041	4.3	3.2	2.3	2.2	3.2	4.2
2042	4.2	3.2	2.3	2.2	3.1	4.1
2043	4.2	3.1	2.3	2.1	3.1	4.0
2044	4.1	3.1	2.2	2.1	3.0	4.0
2045	4.0	3.0	2.2	2.1	3.0	3.9
2046	4.0	3.0	2.2	2.0	2.9	3.9
2047	3.9	2.9	2.1	2.0	2.9	3.8
2048	3.8	2.9	2.1	2.0	2.9	3.7
2049	3.8	2.8	2.1	1.9	2.8	3.7
2050	3.7	2.8	2.0	1.9	2.8	3.6

**Table 3-24: Projected Traffic Growth Rates for Project Road (%)**

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered. Adopting these growth rates for 3A and MAV, the resultant market share of 3A goes down by 5-6 percent from the current level of 14-23 percent across the three plazas. Based on the above growth rates, the average cargo growth (tonnage) is likely to be around 4.6 percent till the end of 2050 and the overall cargo elasticity is estimated to be 0.93.

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll revenue evaluated for both these cases. A growth rate of 200 basis point (2 per cent) lower than base case, for all types of vehicles modes has been considered in low growth scenario. A 100-basis point higher traffic growth rate than the base case has been considered for high growth scenario.

### 3.14 Traffic Projections and Capacity Analysis

**Table 3-25** presents the projections of the total vehicles based on the most likely growth rates till FY50 as assessed in this study.

FY/TPs	Bassi	Aroli	Dhaneshwar	Average
2022	11,225	14,646	15,284	13,718
2023	11,891	15,494	16,160	14,515
2024	12,583	16,376	17,069	15,343
2025	13,307	17,296	18,019	16,207
2026	14,058	18,251	19,003	17,104
2027	14,833	19,236	20,018	18,029
2028	15,650	20,273	21,087	19,003
2029	16,492	21,341	22,188	20,007
2030	17,367	22,452	23,331	21,050
2031	18,193	23,501	24,412	22,035



<b>FY/TPs</b>	<b>Bassi</b>	<b>Aroli</b>	<b>Dhaneshwar</b>	<b>Average</b>
2032	19,042	24,580	25,524	23,049
2033	19,918	25,693	26,670	24,094
2034	20,820	26,838	27,848	25,169
2035	21,744	28,010	29,054	26,269
2036	22,692	29,212	30,292	27,399
2037	23,665	30,446	31,562	28,558
2038	24,665	31,714	32,866	29,748
2039	25,692	33,016	34,204	30,971
2040	26,747	34,351	35,577	32,225
2041	27,826	35,717	36,982	33,508
2042	28,931	37,117	38,420	34,823
2043	30,064	38,549	39,892	36,168
2044	31,221	40,014	41,397	37,544
2045	32,407	41,513	42,937	38,952
2046	33,620	43,047	44,513	40,393
2047	34,860	44,615	46,122	41,866
2048	36,127	46,216	47,767	43,370
2049	37,421	47,851	49,445	44,906
2050	38,742	49,519	51,158	46,473

**Table 3-25: Projected Traffic at Chittorgarh-Kota**

Based on the projected traffic using the recommended Base Case growth rates, the project road traffic on Chittorgarh-Kota is likely to reach 40,000 PCUs in 2046 and will continue to be above 40,000 PCUs for three further consecutive years till 2049 after which NHAI may invite bids for DPR preparation.

The projected traffic for the project road is not likely to reach designed capacity of 60,000 PCU for six laning.

## 4. TOLL REVENUE PROJECTIONS

### 4.1 Tolling Strategy

Generally, in toll road projects, "Open System" of toll collection is specified. As the project road has an existing alignment and there are several roads joining the highway, an open tolling system is implemented on the project road. This enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, three toll plazas are operational on the Chittorgarh-Kota road at Bassi, Aroli and Dhaneshwar.

### 4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

#### Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes. The discounted fee for these users is currently a monthly pass of Rs. 275.00

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

#### Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

#### Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

- (i) Traffic paying normal toll rates (single trip)
- (ii) Traffic paying return journey rates
- (iii) Traffic paying monthly pass rates
- (iv) Traffic paying local personal rates
- (v) Traffic paying local commercial rates

### 4.3 Tolling Streams

In line with the above categories of toll payments, a segmentation of total traffic was assessed from the toll data of FY20. The distribution adopted for the present study is presented in **Table 4-1**.

Ticket Type/Modes	Car	LCV	Bus	2A Truck	3A Truck	MAV
<b>Bassi Toll Plaza</b>						
Single	69.1	61.3	50.2	50.2	77.0	78.7
Return	25.4	22.5	18.8	18.8	11.0	8.6
Monthly Pass						
Local personal						
Local commercial	1.0	8.6	19.9	19.9	8.3	12.6
Exempt	4.5	7.6	11.1	11.1	3.8	0.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Aroli Toll Plaza</b>						
Single	66.3	63.7	54.2	54.2	80.0	90.8
Return	30.2	23.2	24.0	24.0	15.7	8.8
Monthly Pass						
Local personal						
Local commercial	0.9	6.8	12.4	12.4	0.8	0.3
Exempt	2.6	6.3	9.4	9.4	3.5	0.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Dhaneswar Toll Plaza</b>						
Single	61.9	55.9	40.7	40.7	71.3	87.8
Return	26.8	32.9	33.7	33.7	21.5	11.7
Monthly Pass						
Local personal						
Local commercial	8.5	6.0	14.8	14.8	4.6	0.3
Exempt	2.8	5.2	10.8	10.8	2.7	0.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 4-1: Tolling Distribution (incl. Exemptions & Violations) from FY20 (%)**

The paying traffic for the year FY21 has been worked out by deducting the toll exempt percentage from base AADT and is presented in **Table 4-2**.

Particular/Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	OSV
<b>Bassi Toll Plaza</b>							
Base AADT including toll exempted vehicles	2,926	200	136	260	35	1,286	2
% of Exemptions/ Violations	4.5%	7.6%	11.1%	11.1%	3.8%	0.2%	0.0%
Paying Traffic	2,796	185	121	231	33	1,284	2
<b>Aroli Toll Plaza</b>							

Particular/Mode	Car	LCV	Bus	2-axle Truck	3-axle Truck	MAV	OSV
Base AADT including toll exempted vehicles	4,054	314	201	492	55	1,488	3
% of Exemptions/Violations	2.6%	6.3%	9.4%	9.4%	3.5%	0.2%	0.0%
Paying Traffic	3,950	295	182	446	53	1,485	3
<b>Dhaneswar Toll Plaza</b>							
Base AADT including toll exempted vehicles	3,830	199	198	609	126	1,586	2
% of Exemptions/Violations	2.8%	5.2%	10.8%	10.8%	2.7%	0.1%	0.0%
Paying Traffic	3,723	189	177	543	123	1,584	2

**Table 4-2: Toll Paying Traffic, FY21**

The tolling stream distribution excluding exemptions and violations for the paying traffic is presented in **Table 4-3**.

Ticket Type/Modes	Car	LCV	Bus	2 A Truck	3 A Truck	4-6 A Truck
<b>Bassi Toll Plaza</b>						
Single	72.3	66.4	56.4	56.4	80.0	78.8
Return	26.6	24.4	21.1	21.1	11.4	8.6
Monthly Pass	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	1.1	9.3	22.4	22.4	8.7	12.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Aroli Toll Plaza</b>						
Single	68.0	68.0	59.8	59.8	82.8	90.9
Return	31.0	24.8	26.4	26.4	16.3	8.8
Monthly Pass	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.9	7.2	13.7	13.7	0.8	0.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Dhaneswar Toll Plaza</b>						
Single	63.7	58.9	45.6	45.6	73.3	88.0
Return	27.5	34.7	37.8	37.8	22.0	11.7
Monthly Pass	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	8.8	6.3	16.6	16.6	4.7	0.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 4-3: Tolling Distribution (excl. Exemptions and Violations), FY21 (%)**

In case of cars, the normal toll paying traffic is likely to be about 64 – 72 percent across three plazas. Daily pass traffic has a share of 26-31 percent. Local commercial traffic is minimal in cars at Bassi and Aroli; whereas at Dhaneswar, the local commercial share in cars is 8.8 percent.

In case of LCV, around 66-68 percent of the traffic is paying for single ticket at Bassi and Aroli; at Dhaneswar about 59 percent are opting for single ticket. In case of MAV, around

79-90 percent of the truck traffic is opting for normal pass due to their long lead of travel with around 9-11 percent of MAV falling under return pass category.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

#### 4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-4**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

**Table 4-4: Toll Rates in Rs/km for Different Vehicle Categories**

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway.

In addition to this, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at three toll plazas are presented in **Table 4-5**.

	Bassi Toll Plaza	Aroli Toll Plaza	Dhaneswar Toll Plaza
A. Normal length	36.627	53.909	53.500
B. Bypass length @ 1.5 times	15.993	0.000	0.000
C. Equivalent Structure length	3.380	0.910	0.000
D. Total tolling length=(A+1.5*B+C)	63.997	54.819	53.500

**Table 4-5: Tolling Lengths at Three Toll Plazas**

The effective tolling length at Bassi, Aroli and Dhaneswar is 63.997 km, 54.819 km and 53.500 km respectively. The applicable base rates shall be revised annually with effect



from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which sub revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

Actual WPI information for December 2020 of 124.5 under 2011-12 series converted into 1999-00 series ( $124.5 \times 1.873 \times 1.641 = 382.7$ ) has been used. In view of the past inflation trend, the forecast for WPI has been considered as 3.5 percent for the period till 2050 in light of the past growth trend since 2011.

The stream of toll rates to be charged at the toll plazas of the project road for different years till 2050 is presented in **Table 4-6**. The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY/ Modes	Car	LCV/M Bus	Bus/2A	3A	MAV	OSV	Car Local
<b>Bassi Toll Plaza</b>							
2021	75	125	260	285	410	500	275
2022	80	125	265	290	420	510	285
2025	90	145	300	330	470	575	320
2030	110	175	365	400	575	700	390
2035	130	210	445	485	700	850	475
2040	160	260	540	590	850	1,035	575
2045	195	315	660	720	1,035	1,260	700
2050	235	385	800	875	1,260	1,530	855
<b>Aroli Toll Plaza</b>							
2021	65	105	220	240	350	425	275
2022	65	110	230	250	360	435	285
2025	75	125	255	280	405	490	320
2030	95	150	315	340	490	600	390
2035	115	180	380	415	600	730	475
2040	135	220	465	505	725	885	575
2045	165	270	565	615	885	1,080	700
2050	205	330	685	750	1,080	1,310	855
<b>Dhaneswar Toll Plaza</b>							
2021	65	105	215	235	340	415	275
2022	65	105	225	245	350	425	285
2025	75	120	250	275	395	480	320
2030	90	145	305	335	480	585	390
2035	110	180	370	405	585	710	475
2040	135	215	455	495	710	865	575
2045	165	265	550	600	865	1,050	700
2050	200	320	670	730	1,050	1,280	855

**Table 4-6: Toll Rates at Toll Plazas (in Rs)**

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys) the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

#### 4.5 Toll Revenue Estimates

The projections of revenue for the project road has been presented till 2050. Toll revenue streams have been calculated assuming that:

- Toll would be collected for all 365 days in a year and for 366 days in leap year
- Toll revenues have been presented from FY22 to FY50

The mode wise breakdown of toll revenue for the project road for the base case is presented in **Table 4-7**.

FY/ Modes	Car	LCV	Bus	2A	3A	MAV	OSV	Total Revenue
2022	264.9	26.3	36.6	91.6	19.1	620.6	1.2	1,060.2
2023	296.0	28.5	39.1	97.7	20.8	686.7	1.4	1,170.2
2024	328.5	31.4	42.0	104.6	22.6	761.8	1.5	1,292.3
2025	362.3	33.9	44.9	111.6	24.4	836.3	1.6	1,415.1
2026	396.0	36.7	48.4	120.1	26.3	921.3	1.8	1,550.6
2027	435.6	39.7	51.8	128.4	28.5	1,012.2	2.0	1,698.2
2028	487.5	42.8	55.6	137.8	31.0	1,121.0	2.2	1,878.0
2029	534.1	46.4	59.0	146.0	33.4	1,227.4	2.4	2,048.7
2030	592.2	49.9	63.4	156.5	36.1	1,347.7	2.7	2,248.5
2031	636.8	53.6	67.7	166.9	38.8	1,470.6	2.9	2,437.4
2032	702.2	58.3	72.5	178.4	42.0	1,608.6	3.2	2,665.2
2033	759.8	62.8	77.2	189.9	45.2	1,751.7	3.4	2,890.0
2034	835.3	67.6	82.5	202.4	48.6	1,902.3	3.8	3,142.4
2035	909.9	72.5	87.8	214.9	52.4	2,077.3	4.1	3,418.7
2036	981.9	78.5	93.9	229.6	56.5	2,253.7	4.4	3,698.4
2037	1,070.5	83.9	99.8	243.9	60.7	2,443.5	4.8	4,007.0
2038	1,168.4	90.6	106.6	260.2	65.1	2,657.5	5.2	4,353.7
2039	1,270.9	97.9	113.3	276.2	70.0	2,883.9	5.7	4,717.9
2040	1,375.9	104.6	121.0	294.6	75.4	3,129.6	6.2	5,107.2
2041	1,500.7	112.2	128.2	311.5	80.7	3,385.7	6.7	5,525.7
2042	1,624.9	120.5	136.6	331.4	86.5	3,666.2	7.2	5,973.3
2043	1,752.4	129.3	145.3	352.2	92.7	3,969.6	7.8	6,449.4
2044	1,891.8	138.8	155.1	375.4	99.7	4,297.1	8.5	6,966.4
2045	2,053.2	148.5	164.1	396.7	106.3	4,636.9	9.1	7,514.9
2046	2,222.0	158.5	174.4	421.2	114.0	5,006.6	9.9	8,106.6
2047	2,393.0	169.4	185.3	446.9	121.9	5,411.4	10.6	8,738.6
2048	2,615.1	182.6	197.2	475.1	130.8	5,844.0	11.5	9,456.4
2049	2,802.0	194.9	208.6	501.9	139.6	6,285.4	12.4	10,144.7
2050	3,026.0	208.5	221.3	531.8	149.0	6,783.1	13.3	10,933.0

**Table 4-7: Toll Revenue (in Rs crore) for Chittorgarh-Kota Road by Mode**

Cars represent around 27 percent share in total revenue with Buses having a share of 2.4 percent only. Amongst the freight vehicles category, MAVs represent the highest share of around 61.3 percent of total revenue. 3A trucks account for a share of 1.5 percent, LCVs and 2A trucks have a share of 2.0 percent and 5.7 respectively.

## 4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed

on the user of the road. There is an inherent element of uncertainty in any forecast and whilst it is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

### **High Case**

The high case is based on a more optimistic economic outlook for future years as compared to the base case and therefore, based on traffic growth rates of 100 basis points (1 per cent) higher than the base case for every year and for all modes.

### **Low Case**

A growth rate of 200 basis point (2 percent) lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states.

### **Impact of DME**

With the operation of DME, the project road traffic is likely to gain some amount of traffic and this scenario tests the impact of this gain on the project road traffic.

The results of different scenarios are presented in **Table 4-8**. A comparison versus base case has been presented for the Present Value of the project (at 12 per cent discount rate) and the compounded annual growth rate (CAGR) from FY22 to FY50.

FY	Base Case	High Case	Low Case	Impact of DME
2022	1,060.2	1,070.0	1,040.8	1,060.2
2023	1,170.2	1,192.1	1,127.0	1,170.2
2024	1,292.3	1,328.9	1,221.1	1,315.7
2025	1,415.1	1,469.0	1,311.8	1,453.4
2026	1,550.6	1,624.9	1,410.2	1,606.2
2027	1,698.2	1,796.4	1,515.2	1,759.0
2028	1,878.0	2,005.4	1,643.8	1,944.7
2029	2,048.7	2,208.5	1,759.3	2,121.2
2030	2,248.5	2,446.9	1,894.2	2,327.5
2031	2,437.4	2,677.7	2,014.1	2,523.0
2032	2,665.2	2,955.9	2,160.2	2,758.4
2033	2,890.0	3,235.9	2,297.7	2,991.1
2034	3,142.4	3,552.2	2,450.6	3,251.7
2035	3,418.7	3,901.5	2,615.1	3,537.3
2036	3,698.4	4,261.1	2,774.8	3,826.8
2037	4,007.0	4,660.9	2,948.7	4,145.6
2038	4,353.7	5,112.7	3,142.4	4,503.5
2039	4,717.9	5,593.6	3,339.9	4,879.7
2040	5,107.2	6,113.3	3,546.1	5,282.3
2041	5,525.7	6,677.8	3,763.0	5,714.2
2042	5,973.3	7,288.1	3,989.5	6,176.6

FY	Base Case	High Case	Low Case	Impact of DME
2043	6,449.4	7,944.6	4,224.6	6,668.6
2044	6,966.4	8,664.1	4,475.5	7,202.8
2045	7,514.9	9,436.3	4,734.9	7,769.0
2046	8,106.6	10,277.4	5,009.3	8,380.2
2047	8,738.6	11,185.3	5,295.7	9,033.0
2048	9,456.4	12,220.8	5,620.2	9,773.5
2049	10,144.7	13,236.8	5,912.9	10,484.4
2050	10,933.0	14,403.2	6,249.4	11,298.3
PV12	19,690	22,316	15,551	20,285
PV12 vs base		13.3%	-21.0%	3.0%
CAGR FY22 to FY50	8.7%	9.7%	6.6%	8.8%

**Table 4-8: Comparison of Annual Revenues Forecasts in Rs Millions (Base) to Alternate Traffic Growth Assumptions**

The low growth scenario has a negative impact on revenue PV of about 21 percent versus base case (till FY50), whilst the optimistic growth scenario would generate about 13.3 percent higher PV than the base case. The construction of DME will have upside in PV of 3.0 percent.

The project road revenues will have a CAGR of 8.7 percent for the period up to FY50.

Intended for

**NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED**

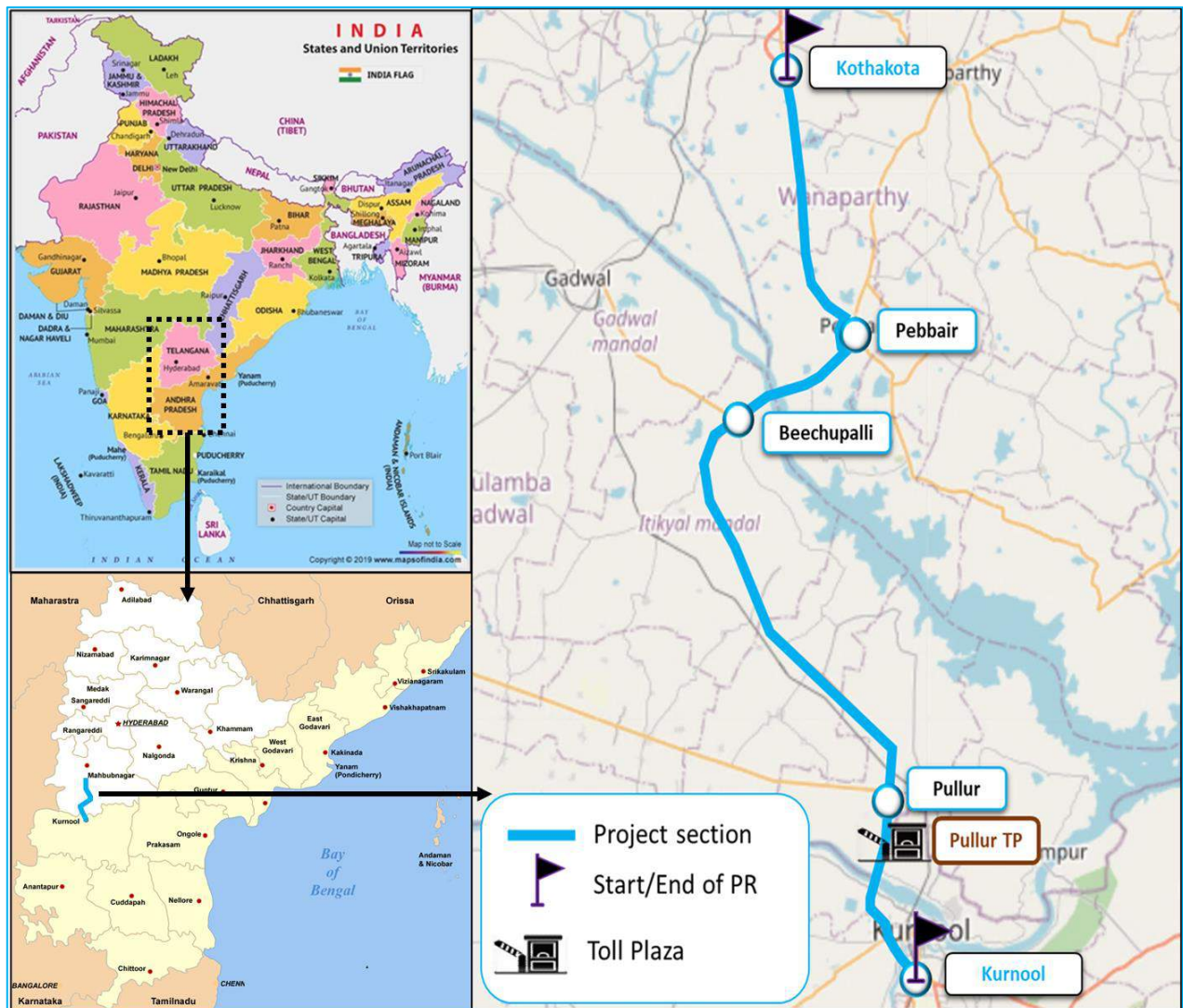
Document type

**Traffic Study Report**


Date

**March 2021**

# INDEPENDENT REVIEW OF TRAFFIC FEASIBILITY STUDY FOR KOTHAKOTA- KURNOOL





Revision	<b>00</b>	
Date	<b>10/03/2021</b>	
Made by	<b>Alvin/Harpreet</b>	
Checked by	<b>Meenakshi Asija</b>	
Approved by	<b>Srinivas Chekuri</b>	
Description	<b>Traffic Study Report</b>	

Ramboll  
The Epitome  
Building No.5, Tower-B  
Floor-17  
DLF Cyber Terrace Phase-III  
Gurgaon-122 002  
India  
T +91 124 4611 999  
F +91 124 4611 998  
[www.ramboll.in](http://www.ramboll.in)

**DISCLAIMER**

*This Report is intended for the **NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED's** sole and exclusive use and is not for the benefit of any third party and may not be distributed to, disclosed in any form to, used by, or relied upon by, any third party, except as agreed between the Parties, without prior written consent of Ramboll, which consent may be withheld in its sole discretion.*

*Use of this Report or any information contained herein, if by any party other than the Client, shall be at the sole risk of such party and shall constitute a release and agreement by such party to defend and indemnify Ramboll and its officers, employees from and against any liability for direct, indirect, incidental, consequential or special loss or damage or other liability of any nature arising from its use of the Report or reliance upon any of its content. To the maximum extent permitted by law, such release from and indemnification against liability shall apply in contract, tort (including negligence), strict liability, or any other theory of liability*

*In preparing this report, Ramboll India Private Limited relied, in whole or in part, on data and information provided by National Highways Infra Investment Managers Private Limited, which information has not been independently verified by Ramboll and which Ramboll has assumed to be accurate, complete, reliable, and current. Therefore, while Ramboll has utilized its best efforts in preparing this Report, Ramboll does not warrant or guarantee the conclusions set forth in this Report which are dependent or based upon data, information, or statements supplied by third parties or the client.*

## ABBREVIATIONS

%	Percentage
2A	2 Axle truck
3A	3 Axle truck
AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AR	Alternate Route
CAGR	Compounded Annual Growth Rate
DBFOT	Design, Build, Finance, Operate and Transfer
FY	Financial Year
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
HCV	Heavy Commercial Vehicles
HME	Heavy Machinery and Equipment
IHMCL	Indian Highway Management Company Limited
IIA	Immediate Influence Area
IRC	Indian Road Congress
JEPL	Jadcherla Expressways Private Limited
Km	Kilometre
KK	Kothakota-Kurnool
LCV	Light Commercial Vehicle
M Bus	Minibus
MAV	Multi Axle Vehicle
MLCV	Mini LCV
NCT	National Capital Territory
NH	National Highway
NHAI	National Highway Authority of India
NHIMPL	National Highways Infra Investment Managers Private Limited
NHDP	National Highway Development Program
NHTIS	National Highway Toll Information System
NPV	Net Present Value
OD	Origin-Destination survey
OECD	Organisation for Economic Cooperation and Development
PCU	Passenger Car Unit
PIA	Project Influence Area
PR	Project Road
RUCS	Road User Cost Study
SEZ	Special Economic Zone
SH	State Highway
SPV	Special Purpose Vehicle

TP	Toll Plaza
TVC	Traffic Volume Count
VOC	Vehicle Operating Cost
VOT	Value of Time
WATL	Western Andhra Expressways Limited
WPI	Wholesale Price Index
YOY	Year on Year

## CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>8</b>
1.1	General	8
1.2	Project Road	9
1.3	Objective and Scope of Work	10
1.4	Structure of Report	11
<b>2.</b>	<b>REVIEW OF BASE REPORT</b>	<b>12</b>
2.1	Coverage	12
2.2	Annual Average Daily Traffic (AADT) - FY21	12
2.3	Travel Pattern	12
2.4	Commodity Distribution	13
2.5	Traffic Growth Rates in Avanza Study	14
2.6	Traffic Projections and Capacity	15
2.7	Traffic Segmentation	16
<b>3.</b>	<b>BASE TRAFFIC ASSESSMENT AND PROJECTIONS</b>	<b>17</b>
3.1	General	17
3.2	Project Road Characteristics	17
3.3	Base Year Traffic	18
3.4	Travel Pattern	21
3.5	Project Road Traffic	22
3.6	Methodology for Traffic Growth Rate Estimation	26
3.7	Identification of PIA States	26
3.8	Past Economic Growth of PIA	27
3.9	India and PIA Outlook	30
3.10	Review of Past Traffic Data	34
3.11	Past and Future Transport Demand Elasticity	35
3.12	Projected Traffic Growth Rates	38
3.13	Traffic Projections and Capacity Analysis	40
<b>4.</b>	<b>TOLL REVENUE PROJECTIONS</b>	<b>41</b>
4.1	Tolling Strategy	41



4.2	Schedule of User Fee	41
4.3	Tolling Streams	42
4.4	Toll Rates	43
4.5	Toll Revenue Estimates	45
4.6	Scenario Analysis	46

## LIST OF TABLES

Table 2-1: Annual Average Daily Traffic (AADT),FY21 – Avanza Report .....	12
Table 2-2: Zone wise OD Shares (%), Avanza Report .....	12
Table 2-3: State wise OD Shares (%), Avanza Report.....	13
Table 2-4 : Vehicle-wise Commodity Distribution - Avanza Study .....	13
Table 2-5: Elasticities Considered in Avanza Study .....	14
Table 2-6: Recommended Elasticity Values in Avanza Study .....	14
Table 2-7 : GSDP Growth Rate (%) Considered in Avanza Study .....	14
Table 2-8: Recommended Growth Rates (%) in Avanza Study .....	15
Table 2-9: Growth Rates (%) under Optimistic/ Pessimistic Scenario in Avanza Study .....	15
Table 2-10 : Projected Traffic, Avanza Study .....	16
Table 2-11: Traffic Segmentation Based on User Fee Collection (%), Avanza Study .....	16
Table 3-1: Growth Trends (%) on WATL.....	19
Table 3-2: Growth Trends (%) on JEPL .....	20
Table 3-3: AADT Estimation for FY21 .....	21
Table 3-4 : Travel Pattern for Kothakota - Kurnool .....	21
Table 3-5: Regional Distribution (%) for the PR .....	22
Table 3-6: Normalised Regional Distribution (%) for the PR.....	27
Table 3-7 : Average Annual Growth Rates (%) of State Income for Telangana .....	28
Table 3-8: Average Annual Growth Rates (%) of State Income for Other PIA States .....	30
Table 3-9: Main Economic Indicators of PIA States .....	32
Table 3-10: Past Multipliers and Future Outlook of PIA States .....	33
Table 3-11: Future Mode-wise Weighted Income of PIA States.....	34
Table 3-12: Past Traffic Comparison from Pullur Toll Plaza Data .....	34
Table 3-13: Past Traffic Comparison from IHMCL AADT .....	34
Table 3-14 : Avanza Counts of FY18 vs FY21 .....	35
Table 3-15: Past Elasticities on WATL .....	36
Table 3-16: Past Elasticities on JEPL .....	36
Table 3-17: Past Elasticities from Toll Data and IHMCL.....	36
Table 3-18: Recommended Elasticity for Project Road.....	38
Table 3-19: Projected Traffic Growth Rates for Project Road (%).....	39
Table 3-20: Projected Traffic at Kothakota-Kurnool .....	40
Table 4-1: Tolling Distribution (incl. Exemptions & Violations) from Q4 of FY19 (%) .....	42
Table 4-2: Toll Paying Traffic, FY21 .....	42
Table 4-3: Tolling Distribution (excl. Exemptions and Violations category), FY21 (%) .....	43
Table 4-4: Toll Rates in Rs/km for Different Vehicle Categories .....	43
Table 4-5: Tolling Lengths at Kothakota-Kurnool .....	44
Table 4-6: Toll Rates at Toll Plaza (in Rs) .....	45
Table 4-7: Toll Revenue (in Rs crore) for Kothakotta-Kurnool by Mode.....	46
Table 4-8: Comparison of Annual Revenues Forecasts in Rs Millions (Base) to Alternate Traffic Growth Assumptions.....	48

## LIST OF FIGURES

Figure 1-1: Project Highway – NH44 .....	8
Figure 1-2: Project Road and Toll Plaza Location .....	9
Figure 3-1: Alignment Map of Adjacent Sections and Project Road.....	18
Figure 3-2: Traffic Trend on Kothakotta-Kurnool and WATL .....	19
Figure 3-3: Traffic Trend on JEPL .....	20
Figure 3-4: Alternate Routes to Bypass Toll Plaza .....	23
Figure 3-5: Alignment of the Economic Corridors and Feeder Roads.....	25
Figure 3-6: GSDP (in Rs billion) and its Sectoral Composition for Telangana .....	28
Figure 3-7: Per Capita Income of Telangana from 2011-12 to 2019-20 .....	29
Figure 3-8: GSDP (in Rs billion) for Other PIA States .....	30
Figure 3-9: GDP Growth in India .....	31
Figure 3-10: GDP Forecast of India by Consensus Economics.....	32

# 1. INTRODUCTION

## 1.1 General

National Highways Authority of India (NHAI) and National Highways Infra Investment Managers Private Limited (NHIIMPL) have identified five road projects for transfer to InvIT in the first stage. Detailed technical and traffic feasibility study reports ("Base Reports") for these roads have been conducted recently by a consultant.

NHIIMPL has appointed M/s. Ramboll India Private Ltd as a traffic consultant to carry out independent review of the Base Report of Kothakota-Kurnool section of NH-44 (carried out by Avanza) to assess the present traffic levels, travel pattern and revenue estimation for the project, duly considering the network characteristics and future economic perspective in the influence area of the project.

The project highway, NH-44, is the longest highway in India connecting Srinagar with Kanyakumari and is part of North-South corridor envisaged under National Highway Development Program (Phase – II). NH-44 passes through the cities of Jammu, Jalandhar, Delhi, Faridabad, Agra, Gwalior, Jhansi, Sagar, Nagpur, Hyderabad, Bengaluru and Salem. **Figure 1-1** shows the alignment of project highway NH 44.



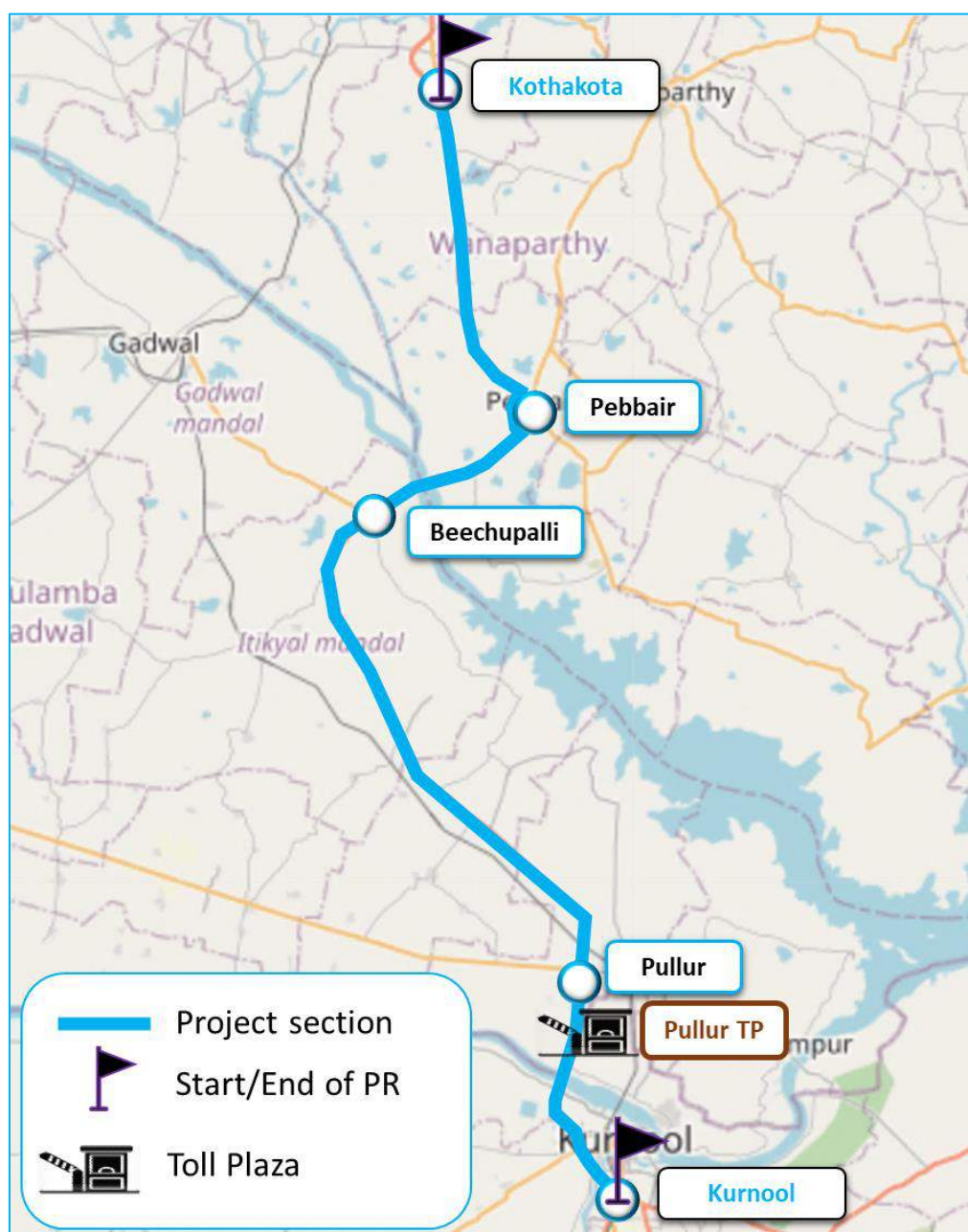
**Figure 1-1: Project Highway – NH44**

The project road section, Kothakota-Kurnool, is part of NH-44 with a length of 75.592 km. Project road starts at Kothakota (Km 135.469) in Telangana state and ends at Kurnool (Km 211.061) in Andhra Pradesh state. The major settlements along the project road section are Pebbair and Beechupalli.

## 1.2 Project Road

The project road section of Kothakota Bypass – Kurnool of NH-44 starts from Kothakota (Km 135.469) in Telangana State and ends at Kurnool (Km 211+061) in Andhra Pradesh State.

The project road in wider context serves for long distance traffic which is majorly plying between Hyderabad/Nagpur/northern region and Bengaluru/Mysuru/southern region. Apart from long distance traffic, it also serves the short distance traffic which is mainly generated between Mahbubnagar/ Kothakota/ Wannaparthy/ Pebbair and Kurnool/Ananthpur areas. There is one existing toll plaza on the project road near Pullur town. The alignment of project road and toll plaza location are shown in **Figure 1-2**.



**Figure 1-2: Project Road and Toll Plaza Location**

The project road section passes through the districts of Wanaparthy in the state of Telangana and Kurnool in the state of Andhra Pradesh.

### **1.3 Objective and Scope of Work**

- Review of Base Reports including review of traffic data – traffic volume count profile, travel pattern from OD survey data
- Analysis of toll/traffic data and bring it in the financial model format and analyse growth trends
- Study appropriateness of methodology used and assumptions regarding
  - ✓ seasonal correction factor
  - ✓ influence area of project and its economic perspective
  - ✓ present and future elasticity of transport demand by vehicle type
  - ✓ distribution of traffic into different tolling streams (normal paying and concessions as applicable in line with CA)
  - ✓ traffic growth rates
  - ✓ impact of upcoming developments and future development potential of the region
  - ✓ study of impact of competing routes in terms of diversion from/to the project road - Identification of competing routes and network condition, traffic characteristics & level of tolls charged, if any on the competing corridors
  - ✓ scenario testing for toll revenue
- Identification of red flags related to key traffic assumptions covered under the base reports
- Identification of key traffic drivers for the project- both upside and downside
- Based on the issues identified related to key traffic assumptions and methodology, modify the assumptions and update the baseline data and future forecasts
- This will include formulation of future economic outlook based on recent economic performance, extent of impact of COVID 19 and expected economic recovery thereafter- traffic forecast based on revised economic outlook from FY21 onwards
- Update the study report based on the revisions to the key assumptions and future forecasts



#### **1.4 Structure of Report**

The report is divided into four chapters, including this introduction chapter. Chapter 2 contains details regarding the methodology adopted by Avanza for base year traffic, travel characteristics in the Project Influence Area (PIA) and traffic growth rates adopted for the study. Chapter 3 contains independent analysis done by Ramboll for the estimation of AADT and the details on the derivation of traffic growth rates used for traffic forecasting with revenue projections. Chapter 4 presents the details regarding tolling strategy, toll rates and the revenue projections till FY50.

## 2. REVIEW OF BASE REPORT

### 2.1 Coverage

This chapter covers the review of the methodology adopted by Avanza for base year traffic estimation, travel characteristics in the Project Influence Area (PIA), traffic growth rates adopted for the study and traffic projections.

### 2.2 Annual Average Daily Traffic (AADT) - FY21

Avanza had done seven days classified Traffic Volume Counts in the months of November 20/ December 20. Due to uncertain travel conditions influenced by COVID-19, Avanza used a SCF of 1 to convert 7 days Average Daily Traffic (ADT) to FY21 AADT. The estimated AADT of FY21 as per the Avanza report is presented in the **Table 2-1**.

FY21	Car	Mini LCV	Mini Bus	Bus	LCV- 4 Tyre	LCV- 6 Tyre	2A truck	3A truck	MAV	OSV	HCM/ EME	Total
AADT- (AVANZA Report)	10,271	1,198	105	1,037	94	1,012	1,609	1,423	2,974	83	62	19,807

**Table 2-1: Annual Average Daily Traffic (AADT),FY21 – Avanza Report**

### 2.3 Travel Pattern

As per the travel pattern analysis by Avanza, the traffic is mainly from Kurnool and beyond locations of Andhra Pradesh. The study presents zone wise and state wise OD shares from the analysis of travel pattern at an aggregate level of passenger and goods traffic. **Table 2-2** presents OD shares by different zones.

Zones of Influence	Passenger	Goods
Kurnool	22.3	10.0
Kothakota	11.9	3.1
Bengaluru, South Karnataka, Kerala	19.7	26.4
Places beyond Kurnool in Andhra Pradesh	9.8	15.9
Telangana/Hyderabad	23.5	7.8
Maharashtra (Mumbai side), North Karnataka	4.7	4.4
Maharashtra (Nagpur Side)	5.0	7.2
Odisha, Chhattisgarh, West Bengal	1.3	0.6
Gujarat, Rajasthan	0.3	8.4
MP, UP, Bihar	1.1	3.8
Delhi, Punjab, Haryana, Himachal, J&K	0.1	12.3

**Table 2-2: Zone wise OD Shares (%), Avanza Report**

The analysis indicates that majority of the traffic is from Kurnool and Telangana in passenger vehicles. Passenger vehicles are also being generated from Kothakota which has a share of around 12 percent and Bengaluru, South Karnataka and Kerala which have a combined share of 19 percent.

In the case of freight vehicles, majority of traffic is coming from Bengaluru/ South Karnataka/ Kerala region. Kurnool and regions beyond Kurnool in Andhra Pradesh have a collective influence of about 26 percent in freight traffic at toll plaza. Other major region of influence in freight vehicles is of northern region from the states of Delhi, Punjab, Haryana, Himachal Pradesh and Jammu & Kashmir.

The state wise OD shares are presented in terms of passenger and goods vehicles in **Table 2-3**.

States of Influence	Passenger	Goods
Telangana	58.0	21.0
Andhra Pradesh	10.0	16.0
Maharashtra	9.6	12.0
Karnataka	19.7	26.4
ROI	3.0	25.0

**Table 2-3: State wise OD Shares (%), Avanza Report**

Avanza considered traffic to/from Kurnool region under Telangana state. Telangana is the major contributor in passenger traffic with 58 percent of traffic followed by Andhra Pradesh with 10 percent and Karnataka with 20 percent.

In case of freight traffic, Telangana contributes 21 percent, Andhra Pradesh contributes 16 percent traffic while Karnataka contributes 26 percent and Maharashtra contributes 12 percent. The other states of India have considerable amount of influence with 25 percent of influence on traffic at toll plaza.

## 2.4 Commodity Distribution

Vehicle wise commodity distribution recorded during Avanza study is presented in **Table 2-4**.

Commodity	LCV	2A	3A	4A	5A	6A
Empty	31	27	21	32	24	100
Agriculture Product	37	12	12	16	0	0
Building Materials	0	17	2	8	33	0
Cattle	1	0	0	0	0	0
Cement	1	0	0	0	0	0
Chemical Products	0	2	2	16	10	0
Coal	0	0	0	8	0	0
Consumer Products	16	17	19	0	0	0
Electronics	0	0	0	5	5	0
Machine and Machine Parts	0	5	5	0	0	0
Manufacturing Products	6	0	21	0	0	0
Metals	0	0	0	8	0	0
Minerals & Ores	1	7	7	5	10	0
Paper	0	0	0	0	0	0
Passenger	0	0	0	0	0	0
Perishables	0	0	0	0	0	0
Petroleum Products	0	5	7	0	0	0
Plastic	0	0	0	0	0	0
Textile Products	0	0	0	0	0	0
Wooden	0	0	0	0	0	0
Miscellaneous	6	7	5	3	19	0
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 2-4 : Vehicle-wise Commodity Distribution - Avanza Study**

At Pullur toll plaza, agricultural products are the main commodity transported in small freight vehicles while chemical products, minerals & ores are the major commodity transported in larger freight vehicles.

## 2.5 Traffic Growth Rates in Avanza Study

The traffic growth rates in Avanza study have been estimated using elasticity approach. Elasticity of past traffic (2015-18) and vehicle registered in Andhra Pradesh (2013-16) as derived in their study are presented in **Table 2-5**.

Mode	Elasticity- past traffic	Elasticity – Vehicle Registered	Average
Car	0.54	0.56	0.55
Bus	-0.28	0.74	0.23
LCV	0.77	0.33	0.55
2A	-0.40	0.64	0.12
3A	-0.67	0.64	-0.02
MAV	0.79	0.64	0.71

**Table 2-5: Elasticities Considered in Avanza Study**

The recommended elasticity values adopted in Avanza study are presented in **Table 2-6**.

Period/Modes	Car	Bus	LCV	2A	3A	MAV
2020-25	0.59	0.79	0.73	-0.44	-0.64	0.73
2025-30	0.53	0.71	0.66	-0.48	-0.71	0.66
2030-35	0.48	0.64	0.59	-0.53	-0.78	0.60
2035-40	0.43	0.57	0.53	-0.58	-0.86	0.54
2040-45	0.39	0.52	0.48	-0.64	-0.94	0.48
2045-50	0.35	0.46	0.43	-0.70	-1.04	0.43

**Table 2-6: Recommended Elasticity Values in Avanza Study**

The source of GDP growth rate of India till FY24 in Avanza study is from IMF which has been moderated by 0.5 percent to calculate the growth rates. India GDP and PIA GSDP for passenger and goods as considered for different time periods is presented in **Table 2-7**.

Period	India GDP	PIA GSDP Passenger	PIA GSDP Goods
2020-25	4.29	4.64	5.11
2025-30	7.18	7.07	7.78
2030-35	6.82	6.71	7.39
2035-40	6.48	6.38	7.02
2040-45	6.16	6.06	6.67
2045-50	5.85	5.76	6.33

**Table 2-7 : GSDP Growth Rate (%) Considered in Avanza Study**

The recommended traffic growth rates under Avanza study are presented in **Table 2-8**.

Period/Modes	Car	Bus	LCV	2A	3A	MAV
FY21	0.00	0.00	0.00	0.00	0.00	0.00
FY22	3.08	4.09	4.20	-2.50	-3.69	4.21
FY23	3.22	4.28	4.39	-2.62	-3.86	4.41
FY24	3.11	4.13	4.24	-2.53	-3.73	4.25
FY25	4.32	-5.73	5.89	-3.51	-5.18	5.90
2025-30	3.77	-5.00	5.13	-3.74	-5.52	5.15
2030-35	3.22	4.28	4.39	-3.91	-5.77	4.40

Period/Modes	Car	Bus	LCV	2A	3A	MAV
2035-40	2.75	3.66	3.75	-4.08	-6.02	3.76
2040-45	2.35	3.13	3.21	-4.26	-6.29	3.22
2045-50	2.01	2.67	2.74	-4.46	-6.58	2.75

**Table 2-8: Recommended Growth Rates (%) in Avanza Study**

In addition, two more sets of growth rate have been presented. The traffic growth rates under optimistic and pessimistic scenario are presented in **Table 2-9**.

Period/Modes	Car	Bus	LCV	2A	3A	MAV
<b>Optimistic Scenario</b>						
FY21	0.00	0.00	0.00	0.00	0.00	0.00
FY22	3.23	4.29	4.41	-2.63	-3.88	4.42
FY23	3.38	4.49	4.61	-2.75	-4.06	4.63
FY24	3.27	4.34	4.46	-2.66	-3.92	4.47
FY25	4.53	6.02	6.18	-3.68	-5.44	6.20
2025-30	3.95	5.25	5.39	-3.93	-5.79	5.40
2030-35	3.38	4.49	4.61	-4.10	-6.05	4.62
2035-40	2.89	3.84	3.94	-4.29	-6.33	3.95
2040-45	2.47	3.28	3.37	-4.48	-6.61	3.38
2045-50	2.11	2.81	2.88	-4.68	-6.91	2.89
<b>Pessimistic Scenario</b>						
FY21	0.00	0.00	0.00	0.00	0.00	0.00
FY22	2.92	3.88	3.99	-2.38	-3.51	4.00
FY23	3.06	4.07	4.17	-2.49	-3.67	4.19
FY24	2.96	3.93	4.03	-2.40	-3.55	4.04
FY25	4.10	5.45	5.59	-3.33	-4.92	5.61
2025-30	3.58	4.75	4.88	-3.55	-5.24	4.89
2030-35	3.06	4.06	4.17	-3.71	-5.48	4.18
2035-40	2.62	3.47	3.56	-3.88	-5.72	3.57
2040-45	2.24	2.97	3.05	-4.05	-5.98	3.05
2045-50	1.91	2.54	2.65	-4.23	-6.25	2.61

**Table 2-9: Growth Rates (%) under Optimistic/ Pessimistic Scenario in Avanza Study**

## 2.6 Traffic Projections and Capacity

The projections of traffic till 2050 as per Avanza study are presented in **Table 2-10**.

Year	Car	M LCV	M bus	Bus	LCV	2A	3A	MAV	OSV	HCM	Total vehicles	Total PCUs	% Growth
2021	11,563	1,198	105	1,037	1,012	1,609	1,423	2,974	83	62	21,066	40,680	
2022	11,563	1,198	105	1,037	1,012	1,609	1,423	2,974	83	62	21,066	40,680	0.0
2023	11,919	1,248	110	1,079	1,055	1,569	1,370	3,099	87	65	21,600	41,595	2.0
2024	12,303	1,303	114	1,125	1,101	1,528	1,317	3,236	90	68	22,185	42,611	2.0
2025	12,686	1,358	119	1,172	1,148	1,489	1,268	3,373	94	70	22,778	43,653	2.0
2026	13,234	1,438	126	1,239	1,215	1,437	1,203	3,572	100	75	23,638	45,180	3.0
2027	13,732	1,512	132	1,301	1,278	1,383	1,136	3,756	105	78	24,414	46,548	3.0
2028	14,249	1,589	139	1,366	1,343	1,331	1,073	3,949	110	83	25,234	48,015	3.0
2029	14,786	1,671	146	1,435	1,412	1,282	1,014	4,153	116	87	26,100	49,585	3.0
2030	15,342	1,757	153	1,506	1,485	1,234	958	4,366	122	91	27,015	51,259	3.0
2031	15,920	1,847	161	1,582	1,561	1,188	905	4,591	128	96	27,979	53,043	3.0
2032	16,432	1,928	167	1,649	1,630	1,141	853	4,793	134	100	28,828	54,610	3.0



Year	Car	M LCV	M bus	Bus	LCV	2A	3A	MAV	OSV	HCM	Total vehicles	Total PCUs	% Growth
2033	16,962	2,013	175	1,720	1,701	1,097	804	5,004	140	105	29,719	56,267	3.0
2034	17,508	2,101	182	1,793	1,776	1,054	758	5,224	146	109	30,650	58,017	3.0
2035	18,071	2,193	190	1,870	1,854	1,013	714	5,454	152	114	31,625	59,861	3.0
2036	18,653	2,289	198	1,950	1,935	973	673	5,694	159	119	32,643	61,804	3.0
2037	19,166	2,375	205	2,021	2,007	933	632	5,908	165	123	33,538	63,507	3.0
2038	19,694	2,464	213	2,095	2,083	895	594	6,130	171	128	34,468	65,290	3.0
2039	20,236	2,557	221	2,172	2,161	859	558	6,361	178	133	35,435	67,155	3.0
2040	20,793	2,653	229	2,251	2,242	824	525	6,600	185	138	36,439	69,103	3.0
2041	21,366	2,752	237	2,333	2,326	790	493	6,849	191	143	37,480	71,136	3.0
2042	21,869	2,840	244	2,406	2,401	756	462	7,069	198	148	38,393	72,914	2.0
2043	22,383	2,931	252	2,482	2,478	724	433	7,296	204	152	39,335	74,761	3.0
2044	22,910	3,025	260	2,559	2,557	693	406	7,531	211	157	40,309	76,679	3.0
2045	23,449	3,123	268	2,639	2,639	664	380	7,773	217	162	41,314	78,668	3.0
2046	24,001	3,223	276	2,722	2,724	635	356	8,023	224	168	42,352	80,730	3.0
2047	24,484	3,311	284	2,794	2,798	607	333	8,243	230	172	43,258	82,528	2.0
2048	24,977	3,402	291	2,869	2,875	580	311	8,470	237	177	44,189	84,385	2.0
2049	25,479	3,495	299	2,946	2,954	554	290	8,703	243	182	45,146	86,301	2.0
2050	25,992	3,591	307	3,025	3,035	529	271	8,942	250	187	46,129	88,277	2.0

**Table 2-10 : Projected Traffic, Avanza Study**

Avanza report mentions that as per the Concession Agreement for InvIT projects, NHAI may undertake or cause to undertake the process for capacity augmentation of the Project Stretch to 6/8-lane configuration in case the average daily tollable traffic in any accounting year exceeds the designed capacity of 40,000 PCUs for Project Stretch and continues to exceed the designed capacity for three consecutive accounting years. According to the estimated traffic projections, the Authority could undertake the process for capacity augmentation of this project stretch at any time now.

## 2.7 Traffic Segmentation

**Table 2-11** gives the traffic segmentation based on monthly user fee collection of 2020 (January to November) from the toll plaza data as presented in Avanza study.

Average Traffic Segment Passing through toll plaza for Year	CJV	LCV/ M Bus	Truck/ Bus (2A)	3A	HCM/ EME	OSV
All types of single Entry	74.26	84.94	66.16	84.05	82.15	85.24
Multiple Entry	1.05	1.15	2.26	0.41	0.49	0.08
Local Vehicle	0.00	0.00	0.00	0.00	0.00	0.00
Re-usage of Multiple Entry ticket	5.34	7.46	9.90	8.38	8.17	7.74
Re-usage of Monthly Passes	0.00	0.00	0.00	0.00	0.00	0.00
Commercial Vehicles registered in the District	0.05	0.00	0.00	0.00	0.00	1.15
Exempted etc.	19.30	6.44	21.68	7.17	9.19	5.79
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

**Table 2-11: Traffic Segmentation Based on User Fee Collection (%), Avanza Study**

### **3. BASE TRAFFIC ASSESSMENT AND PROJECTIONS**

#### **3.1 General**

The project road is currently under OMT and the projections of traffic and revenue have been presented till 2050 in line with the scope of work. The estimation of the traffic using the tolled highway and its future growth are important elements to assess the project's economics as they are generally the main/sole source of revenue for the project. This chapter details various aspects of the current traffic of the project road and its growth potential as assessed by Ramboll.

#### **3.2 Project Road Characteristics**

The project road section passes through the districts of Wanaparthy in the state of Telangana and Kurnool in the state of Andhra Pradesh. A brief description of the profile of these two districts is presented below.

##### **Wanaparthy District**

Wanaparthy district is situated in south-east part of Telangana State, sharing border with the state of Andhra Pradesh. Wanaparthy district is surrounded by Mahabubnagar district in north, Nagarkurnool district in east, the state of Andhra Pradesh in south and Jogulamba Gadwal district in west. As per 2011 census, 0.57 million people reside in the district over an area of 2,152 sq. km. Agriculture is the main livelihood of the people in Wanaparthy district with 75% total workers engaged in agro-based labour. Red sandy soil and sandy loam soil covers 89% of the area. Paddy, groundnut, jowar, maize, red gram, castor, cotton and chili are the major crops cultivated within the district. Wanaparthy district, being one of the newly formed districts finds its place in backward districts of the state. Sri Ranganayaka Temple, Ghanpur Fort, Pangal Fort, Wanaparthy Palace, Saralasagar Project are few tourist attractions present in the district.

##### **Kurnool District**

Kurnool District is situated in Western part of Andhra Pradesh. It is surrounded by Nagarkurnool, Wanaparthy districts of Telangana state in north, Kadapa and Anantapur Districts in south, the Bellary district of Karnataka state in west and Prakasam District in east. As per 2011 census, 4.05 million people reside in the district over an area of 17,658 sq. km. Almost half of the geographical area is under agriculture use. Paddy, cotton, tomato and onion are the major crops grown in the district. Mining/quarrying is the prevailing industry in the district. District has deposits of limestone, iron ore, barites and shale within its geographical area. Belum Caves, Mahanandi, Manthralayam, Srisailem and Rollapadu sanctuary are the main tourist attractions in the district.

### 3.3 Base Year Traffic

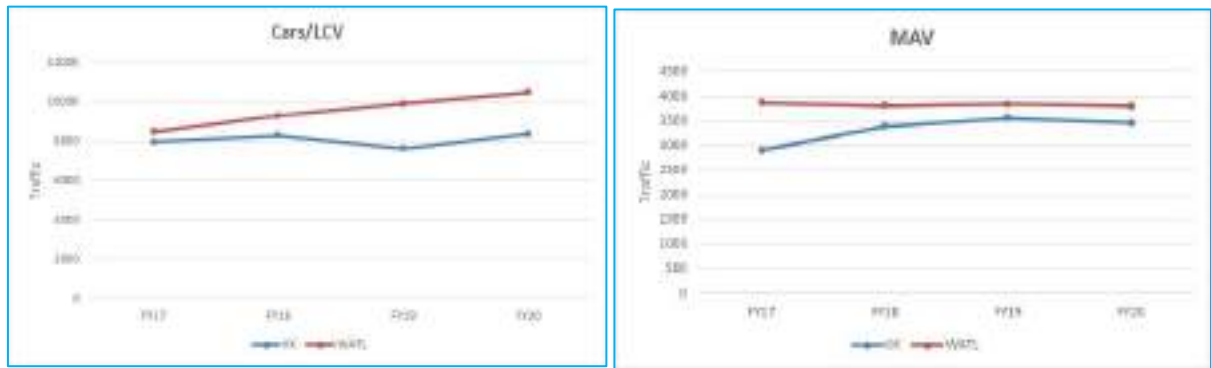
The toll data for the project road has been provided from April 2016 to Feb 2021 including ETC traffic. As the year FY21 has been impacted by COVID, the traffic on the toll plaza has shown a high variation in month on month traffic. After opening of the economic activities post lockdown, the traffic on most of the highways has started to get back to normal levels. In case of Kothakotta-Kurnool, low traffic levels were observed in April and May due to complete shutdown of economic activities, which started showing a pickup from June to August. The traffic from September onwards shows an abrupt increase in car traffic which could be due to the pent-up demand and less buses plying on the road coupled with limited rail services due to social distancing norms. Therefore, taking an average of June to February for car traffic would make the base AADT high which is not likely to be sustained in future.

In addition to this, the traffic on the adjacent toll roads of Jadcherla Kothakota (Western Andhra Tollway Limited - WATL) and Thondapalli-Jadcherla (JEPL) was also assessed. The alignment map of the two sections along with the project road is presented in **Figure 3-1**.



**Figure 3-1: Alignment Map of Adjacent Sections and Project Road**

The behavior of traffic observed on WATL seems to be in line with the traffic observed on the Project Road of KK. The graphs in **Figure 3-2** present a year on year comparison of Cars/LCV and MAVs of the two projects.



**Figure 3-2: Traffic Trend on Kothakotta-Kurnool and WATL**

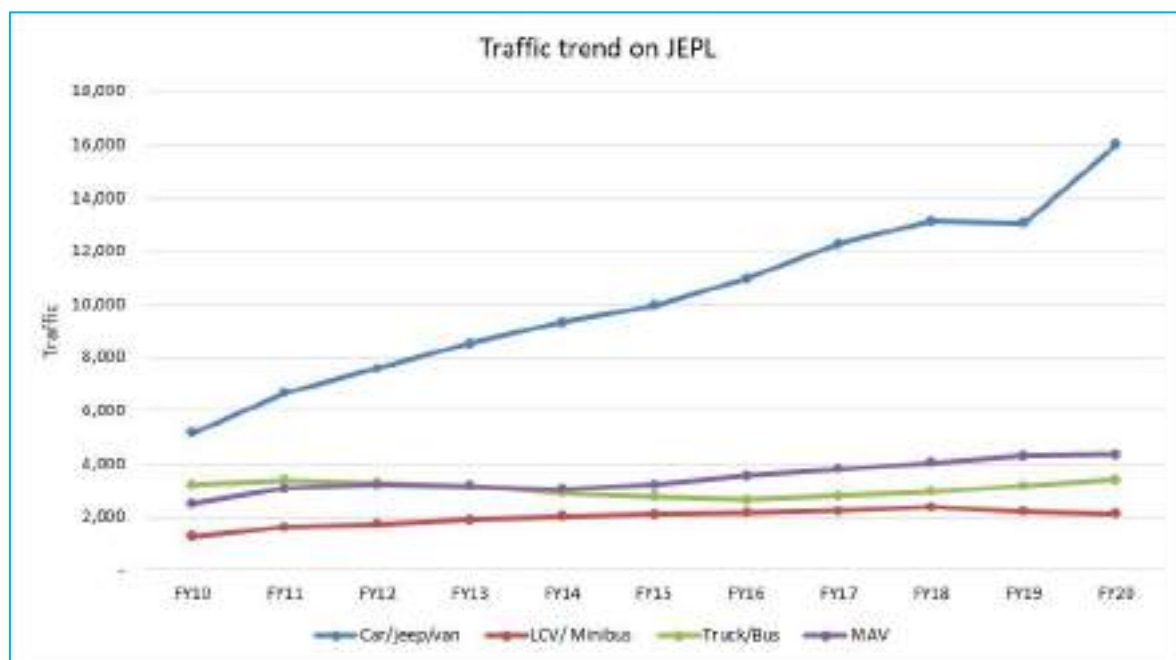
The year on year growth trend observed on WATL is presented in **Table 3-1**.

FY/Modes	CJV	LCV	Bus	Truck 2 axle	MAV
<b>Year on Year growth %</b>					
FY10 vs 11	36.2	20.2	21.8	-6.0	10.6
FY11 vs 12	20.4	8.1	1.2	-8.0	10.6
FY12 vs 13	13.7	10.0	2.8	-10.3	-1.4
FY13 vs 14	9.7	6.3	-15.7	-7.1	-0.1
FY14 vs 15	7.1	1.9	1.1	-10.2	9.1
FY15 vs 16	17.0	-1.2	-4.7	4.7	13.1
FY16 vs 17	10.6	-3.8	8.6	24.2	16.9
FY17 vs 18	11.8	0.5	4.9	4.8	-1.6
FY18 vs 19	8.0	-1.4	12.0	9.8	0.8
FY19 vs 20	7.4	-6.0	-8.8	8.4	-1.2
FY20 vs 21	20.4	11.2	-43.9	5.1	-3.3
<b>End point Growth %</b>					
FY11 vs FY20	11.7	1.5	-0.2	1.2	4.9
FY11 vs FY15	12.6	6.5	-2.9	-8.9	4.4
FY15 vs FY20	10.9	-2.4	2.1	10.1	5.3

**Table 3-1: Growth Trends (%) on WATL**

The growth in cars over last 10 years have been around 10-11 percent on WATL section. This section shows a reasonable growth in 2A truck over recent years. MAV trucks have also shown a 5.3 percent end point growth between FY15 and FY20 but there has been year on year variation in the growth trends.

In addition to WATL, the traffic trend on the section of Thondapalli-Jadcherla (JEPL) was also assessed to get some indications of past growth on the corridor. The traffic trend on the JEPL section are presented in **Figure 3-3**.



**Figure 3-3: Traffic Trend on JEPL**

The year on year growth trend observed on JEPL is presented in **Table 3-2**.

FY/Modes	Car/Jeep/Van	LCV/Minibus	Truck/Bus	MAV
<b>Year on Year growth %</b>				
FY10 vs FY11	28.8	27.5	5.3	22.2
FY11 vs FY12	13.9	7.5	-2.9	4.9
FY12 vs FY13	12.2	9.1	-2.5	-2.4
FY13 vs FY14	9.5	5.6	-9.5	-3.0
FY14 vs FY15	6.6	3.6	-4.7	5.7
FY15 vs FY16	10.2	4.4	-4.2	9.9
FY16 vs FY17	11.9	3.0	5.8	7.7
FY17 vs FY18	7.0	6.1	5.5	5.8
FY18 vs FY19	-0.5	-6.7	7.0	6.8
FY19 vs FY20	22.5	-4.2	7.5	0.6
<b>End point Growth %</b>				
FY11 vs FY20	10.2	3.0	0.1	3.9
FY16 vs FY20	9.9	-0.6	6.4	5.2

**Table 3-2: Growth Trends (%) on JEPL**

The section of Thodapalli - Jadcherla also shows a robust growth trend in cars and a reasonable growth in Truck/Bus and MAV comparisons.

In order to estimate the AADT for FY21, following the growth trends on the adjacent sections, a 10.9 growth on cars (average growth observed during FY15 to FY20) has been applied on the base FY20 car AADT. The average number of LCV in FY21 as observed during June to February is 2,000 as against the average of 1,857 for FY20 indicating a very high growth, which could be due to release of pent up demand as well as some growth. In view of this, a nominal growth rate of 3 percent has been applied on FY20 LCV. In case of Bus/2A trucks, a nominal growth of around 2 percent has been considered. For 3A/MAV, the growth rate observed on Pullur toll plaza from FY19 to FY20 has been applied.



The FY20 toll data, average of toll data for June 2020 to February 2021 and resultant AADT adopted for the project road section is presented in **Table 3-3**.

Particular/Modes	CJV	LCV	Bus	Truck 2 axle	3A	MAV	PCUs
FY20 Toll data	6,728	1,857	940	1,459	1,345	2,216	30,715
Average of June-February 2021	8,657	2,000	759	1,178	1,267	2,282	31,537
Adopted AADT for FY21	7,464	1,913	940	1,502	1,236	2,345	31,293

**Table 3-3: AADT Estimation for FY21**

### 3.4 Travel Pattern

The travel pattern has been derived from the analysis of the raw OD data which was shared with the consultants. The travel pattern in terms of main traffic streams as analysed from this OD are presented in **Table 3-4**.

States/Mode	Car	Bus	MLCV	LCV	2A	3A	MAV
Kothakota - Kurnool	6.0	2.2	18.2	6.4	0.7	2.2	2.6
Kothakota - Bangalore, South Karnataka, Kerala	3.6	0.0	4.5	0.9	0.7	1.5	2.2
Kothakota-Places beyond Kurnool in Andhra Pradesh	1.8	1.1	0.0	0.9	0.0	0.0	0.4
Telangana/Hyderabad-Kurnool	14.5	13.2	31.8	13.8	3.6	1.5	8.6
Telangana/Hyderabad-Bangalore, South Karnataka, Kerala	28.6	50.5	27.3	29.4	25.7	16.1	18.1
Telangana/Hyderabad-Places beyond Kurnool in Andhra Pradesh	19.8	8.8	9.1	22.9	7.1	1.5	2.6
Maharashtra/Karnataka/CH Orissa/WB -Kurnool and beyond	19.0	22.0	4.5	8.3	18.6	19.0	22.0
Gujarat, Rajasthan and NI-Kurnool and beyond	6.7	2.2	4.5	17.4	43.6	58.4	43.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-4 : Travel Pattern for Kothakota - Kurnool**

In case of passenger vehicles, the traffic streams of Telangana/ Hyderabad to Bangalore and Kurnool & beyond in Andhra Pradesh has a major share of 48.4 percent in cars and around 59 percent in Buses. The local stream of traffic from Hyderabad/ Kothakota to Kurnool has a share of 20.5 percent in cars and 15.4 percent in Buses.

The truck traffic on the project road caters to the North-South traffic from Maharashtra which is around 19-22 percent in 3A and MAV trucks. The traffic generated from Gujarat and North Indian States is around 58 percent in 3A trucks and 43 percent in MAVs.

The regional distribution as derived from the OD analysis is presented in **Table 3-5**.

States/Mode	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
Telangana	45.6	45.7	46.4	22.5	13.5	22.4
Andhra Pradesh	19.9	17.8	8.8	6.1	4.4	6.3
Maharashtra	9.1	4.6	11.0	8.2	7.3	9.5
Karnataka	22.2	24.7	33.1	40.4	43.4	38.6
Gujarat	0.0	0.0	0.0	1.4	6.6	8.6
Rajasthan	0.0	0.0	0.0	2.1	2.6	1.1
Delhi	0.0	0.0	0.0	10.7	13.1	5.6
ROI	3.2	7.3	0.6	8.6	9.1	8.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-5: Regional Distribution (%) for the PR**

The regional distribution shows that Telangana, Andhra Pradesh, Karnataka and Maharashtra are the main contributors of traffic on the project road in case of passenger vehicles. Telangana has a share of 46 percent each in cars and buses and Karnataka contributes around 22 percent in cars and 33 percent in buses. Andhra Pradesh contributes around 20 percent in cars and 9 percent in buses. Around 9-11 percent share is from Maharashtra in cars/buses.

In case of freight vehicles, Karnataka contributes the highest around 40 percent in Trucks, 3A and MAV signifying the long-distance traffic on the project road. Telangana has a share of around 13-22 percent in these categories of trucks. Around 4-9 percent is being contributed by Andhra Pradesh and Maharashtra. In addition to this, the states of Delhi and Gujarat contribute to the long-distance traffic on the project road with Delhi having a share of around 5-13 percent and Gujarat contributing around 7-8 percent.

### 3.5 Project Road Traffic

The traffic that is likely to use the project road was estimated on the basis of the traffic and travel characteristics gathered as part of the study. The traffic on the project road would normally consist of the following components:

- Normal Traffic
- Diverted Traffic
- Induced/Developmental Traffic

#### 3.5.1 Normal Traffic

Normal traffic is the traffic which is already plying on the project road as assessed in Table 3-3.

#### 3.5.2 Diverted Traffic

Diverted traffic is generally dictated by the presence of an alternative route at a lower generalised cost, which is in-turn defined by the road configuration and its condition, the type of vehicle and its operating costs, the average riding speed, the route distance and any tolling that may apply on a specific route.

In context of the project road, there are no routes in vicinity of toll plazas to avoid the project roads' individual toll plazas. However, there is a parallel route to the project road

which starts from Mahbubnagar to Bangalore. The road map showing PR and AR is depicted in **Figure 3-4**.



**Figure 3-4: Alternate Routes to Bypass Toll Plaza**

The route via project road is around 482 km in length and the distance via alternate route is 614 km. Since, the project road sections from Hyderabad-Jadcherla-Kothakotta-Kurnool sections are already tolled & travel pattern is already established and with the alternate route being 132 km longer than the project road, the route does not pose any threat to the project road traffic.

### 3.5.3 Induced/ Development Traffic

Developmental /new generated traffic is the one which would be generated, over and above normal growth, because of lowering of transport costs or new developments in the

immediate influence area of the project road. In case of the project road, there is no development envisaged in the vicinity of the project road.

Bharatmala Pariyojana is the second largest highways construction project in the country since NHDP, under which almost 50,000 km of highway roads were targeted across the country. It will look to improve connectivity particularly on economic corridors, border areas and far flung areas with an aim of quicker movement of cargo and boosting exports.

It will connect 550 district headquarters to minimum 4-lane highway by raising the number of corridors to 50 (from current 6) and move 80 percent freight traffic (currently 40 percent) to national highways by connecting 24 logistics parks and 7 north east multimodal waterway ports.

The Phase-I includes economic corridors of around 9,000 km; inter-corridor and feeder routes of around 6,000 km; 5,000 km roads under the National Corridors Efficiency Program, border and international connectivity roads of around 2,000 km; coastal and port connectivity roads of around 2,000 km; expressways of around 800 km and 10,000 km of NHDP roads. The total length in phase 1 comes to around 34,800 km.

In the context of the project influence area, there are a few economic corridors and inter corridors listed in the Telengana and Andhra Pradesh. The economic corridors planned in these states are Chennai-Kurnool, Solapur-Mahbubnagar and Pune-Vijayawada and is likely to improve connectivity with an aim to provide quicker movement of cargo. **Figure 3-5** presents the details of the upcoming projects under Bharatmala in the project influence area in the context of the project section.



**Figure 3-5: Alignment of the Economic Corridors and Feeder Roads**

As the project road caters to the long/ short distance traffic, it is likely to have a potential for growth in view of the developments of these economic corridors and feeder roads. This project section being a part of 4 laned tolled North-South corridor, will continue to remain an important highway for the North-South movement especially Hyderabad-Bangalore/Chennai and may see sustained growth in the future. The project road caters to the North-South traffic from Maharashtra which is around 19-22 percent in 3A and MAV trucks. The traffic generated from Gujarat and North Indian States is around 58 percent in 3A trucks and 43 percent in MAVs. Since, majority of the traffic is from North India to Kurnool and beyond, the traffic on this highway is likely to grow at a faster pace to fulfill the industrial demands from/to North India to/from Bangalore/Chennai and other parts of South India.

In addition, the state of Andhra Pradesh has finalised the tender for the development of 6,400 MW mega solar power plant across 10 parks. The park in Kurnool district (Kolimigundla Ultra Mega Solar Park, Kolimigundla Mandal) is being developed with a capacity of 600 MW. The proposed solar power plants will strengthen the rural economy and improve the living standards of farmers by providing energy to the agricultural sector which consumes up to 30 per cent of the total power consumption.



### 3.6 Methodology for Traffic Growth Rate Estimation

Traffic growth for both passenger and freight vehicles has been estimated using the econometric approach as described in IRC-108, 1996. For freight traffic, due consideration has been given to the total tonnage transported and the shift in types of vehicles used for moving goods.

The econometric model applied, relates traffic growth to changes in state (or district) domestic product via an elasticity factor. According to IRC guidelines, elasticity based econometric model for highway projects should be derived in the following form:

$\text{Log}_e(P) = A_0 + A_1 \text{Log}_e(EI)$ , where:

P	- Traffic Volume
EI	- Economic Indicator
A0	- Regression Constant
A1	- Regression Co-efficient (Elasticity Index)

In order to estimate traffic on the project road, the methodology described below has been followed:

- Identify the influence area - From the analysis of OD survey data, the project influencing states and districts, which are likely to impact the traffic growth on the project road, were identified.
- Review Past traffic Data – Based on toll data available for the project, a review of past traffic and tonnage growth is carried out.
- Analysis of economic growth of the Project Influencing Area (PIA) - For each PIA state, an economic profile describing past performance and future outlook was prepared. This also considers India's past economic performance and its future outlook.
- Estimation of traffic elasticity to income – in order to translate economic growth into traffic growth, an elasticity factor was estimated.
- Derivation of traffic growth rates – On the basis of the weighted (based on OD shares) PIA outlook and related traffic elasticity, traffic growth rates were estimated.

The methodology thus adopted incorporates, as basic data inputs, the perspective growth envisaged in the influence area and the changes in transport demand elasticities over a period of time. The traffic growth rates by vehicle type for the project road have been determined till 2050.

### 3.7 Identification of PIA States

The regional distribution shows that Telangana, Andhra Pradesh, Karnataka and Maharashtra are the main contributors of traffic on the project road in case of passenger vehicles. In case of freight traffic, states of Delhi and Gujarat also contribute to the

project road traffic in addition to the four states of Telangana, Andhra Pradesh, Maharashtra and Karnataka.

The states of Telangana, Andhra Pradesh, Maharashtra and Karnataka have, therefore, been considered as the PIA states for passenger traffic. In case of freight traffic, states of Delhi and Gujarat have also been considered as PIA states in addition to the four states of Telangana, Andhra Pradesh, Maharashtra and Karnataka. The mode wise normalized regional distribution shares are presented in **Table 3-5**.

States/Mode	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
Telangana	47.1	49.3	46.7	25.2	15.3	24.6
Andhra	20.6	19.2	8.9	6.8	5.0	6.9
Maharashtra	9.4	4.9	11.1	9.2	8.3	10.4
Karnataka	22.9	26.6	33.3	45.2	49.2	42.4
Delhi	0.0	0.0	0.0	12.0	14.9	6.2
Gujarat	0.0	0.0	0.0	1.6	7.4	9.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 3-6: Normalised Regional Distribution (%) for the PR**

The regional distribution shows that Telangana, Andhra Pradesh, Karnataka and Maharashtra are the main contributors of traffic on the project road in case of passenger vehicles. Telangana has a share of 47 percent each in cars and buses and Karnataka contributes around 23 percent in cars and 33 percent in buses. Andhra Pradesh contributes around 20 percent in cars and 9 percent in buses. Around 9-11 percent share is from Maharashtra in cars/buses.

In case of freight vehicles, Karnataka contributes the highest around 40-50 percent in Trucks, 3A and MAV signifying the long-distance traffic on the project road. Telangana has a share of around 15-25 percent in these categories of trucks. Around 5-10 percent is being contributed by Andhra Pradesh and Maharashtra. The state of Delhi contributes around 15 percent in 3A trucks and 6 percent in MAVs. Around 7-9 percent is the contribution of Gujarat in 3A and MAV trucks.

### 3.8 Past Economic Growth of PIA

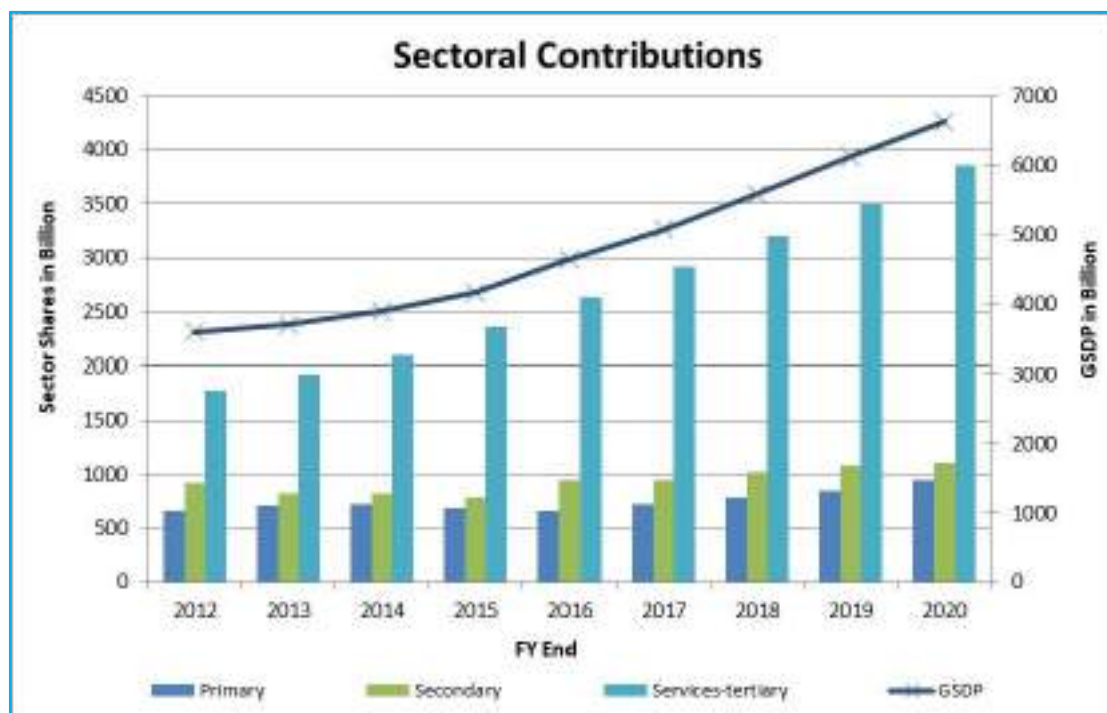
Growth of traffic on the project road depends on existing development and future growth prospects of the connecting regions. A number of economic indicators for the PIA states, as published by Central Statistical Organisation (2011-12 prices), have been studied to assess their past performance.

#### **Telangana**

- Telangana's Gross State Domestic Product (GSDP) stood at Rs 6,632 billion in 2019-20 and has been growing at a compounded annual growth rate of 8.5 per cent since 2011-12.
- The state's growth had been between 7-10 percent since 2014-15. It has shown a growth of around 8.2 percent in FY20.

- The services sector is the largest contributor to GSDP (65.3 percent), agriculture allied activities sector at 16 percent, secondary sector at 18.7 per cent of the GSDP in 2019-20.

The change of sectoral composition of GSDP over the years is presented in **Figure 3-6**.



**Figure 3-6: GSDP (in Rs billion) and its Sectoral Composition for Telangana**

The performance of the state economy and its different sectors has been studied using time trend analysis. The average annual growth rates as obtained using regression analysis are presented in **Table 3-7**.

Particulars	2011-12 to 2019-20	2014-15 to 2019-20
GSDP	8.5	9.7
Agriculture and Allied	3.7	7.3
Industry	3.7	6.5
Services	10.4	10.2
Construction	2.1	2.4
Per Capita Income	7.4	8.7

**Table 3-7 : Average Annual Growth Rates (%) of State Income for Telangana**

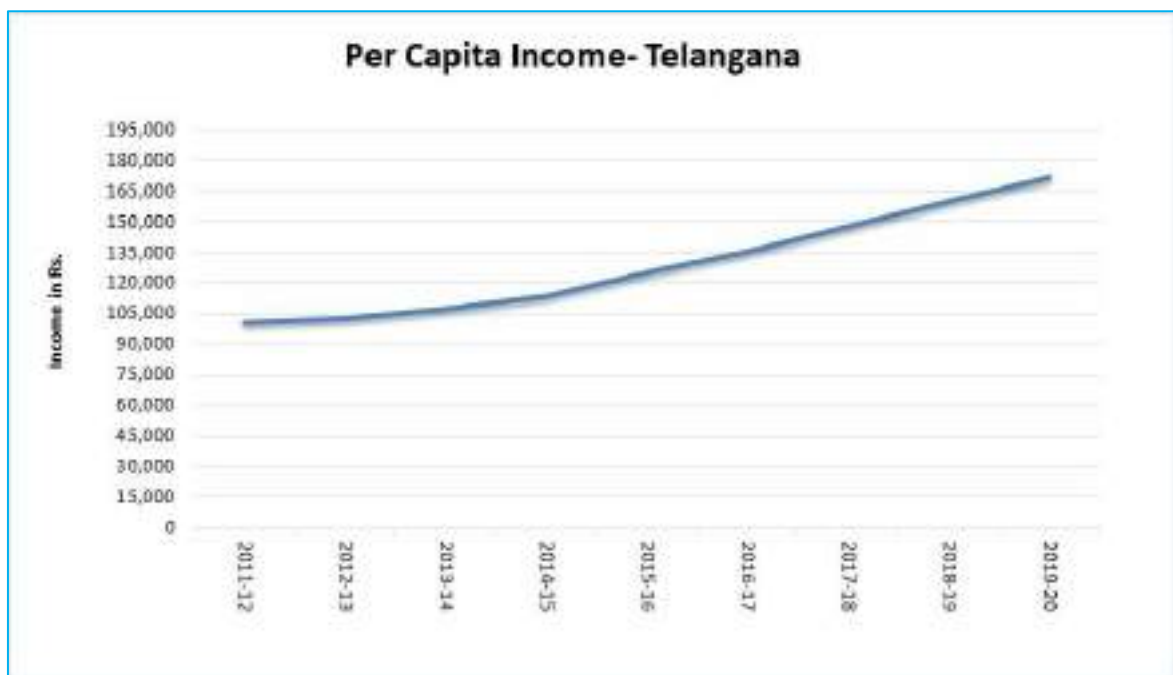
Currently, the state has 30 operational Special Economic Zones (SEZs). Also, 63 more have been formally approved and 56 have been notified. These SEZs are dispersed over a manifold range of sectors including biotechnology, aerospace industry, electronics hardware, multi-product, gems and jewellery, IT SEZs etc.

Telangana State Industrial Infrastructure Corporation (TSIIC) is a body set up for promoting and facilitating industrial development in the state. As of March 2018, the body has set up 170 industrial parks in the state.

According to by Department for Promotion of Industry and Internal Trade (DPIIT), the state has enticed the Foreign Direct Investment (FDI) equity inflows worth US\$ billion during the period April 2000 to September 2019.

In order to attract high investments and catalyze growth, the state is highlighting the need to facilitate port logistics and road infrastructure development. The state has anticipated to develop six industrial corridors. The state has also planned to monetize Nehru Outer Ring Road (NORR), which is a 158 km expressway encircling the capital city of Hyderabad.

The per capita income of Telangana is Rs 1,71,642 in the year 2019-20 and has been growing at 7.4 percent during 2011-12 to 2019-20. The growth in per capita income is presented in **Figure 3-7**.



**Figure 3-7: Per Capita Income of Telangana from 2011-12 to 2019-20**

#### **Other PIA States**

The other PIA states contributing to the traffic on the project road are Andhra Pradesh, Maharashtra, Karnataka, Delhi and Gujarat.

- Maharashtra's Gross State Domestic Product (GSDP) stood at Rs 20,390 billion in 2018-19 and has been growing at a compounded annual growth rate of 8.5 percent since 2011-12.
- Andhra Pradesh's Gross State Domestic Product (GSDP) is reported to be Rs 6,720 billion in FY20 with an annual growth rate of 8.2 percent since FY12.
- Karnataka's GSDP is around Rs 12,010 billion and has been growing at 9.5 percent since FY12.
- Delhi's GSDP is around Rs 6,344 billion and has shown a growth of around 8.2 percent since FY12.

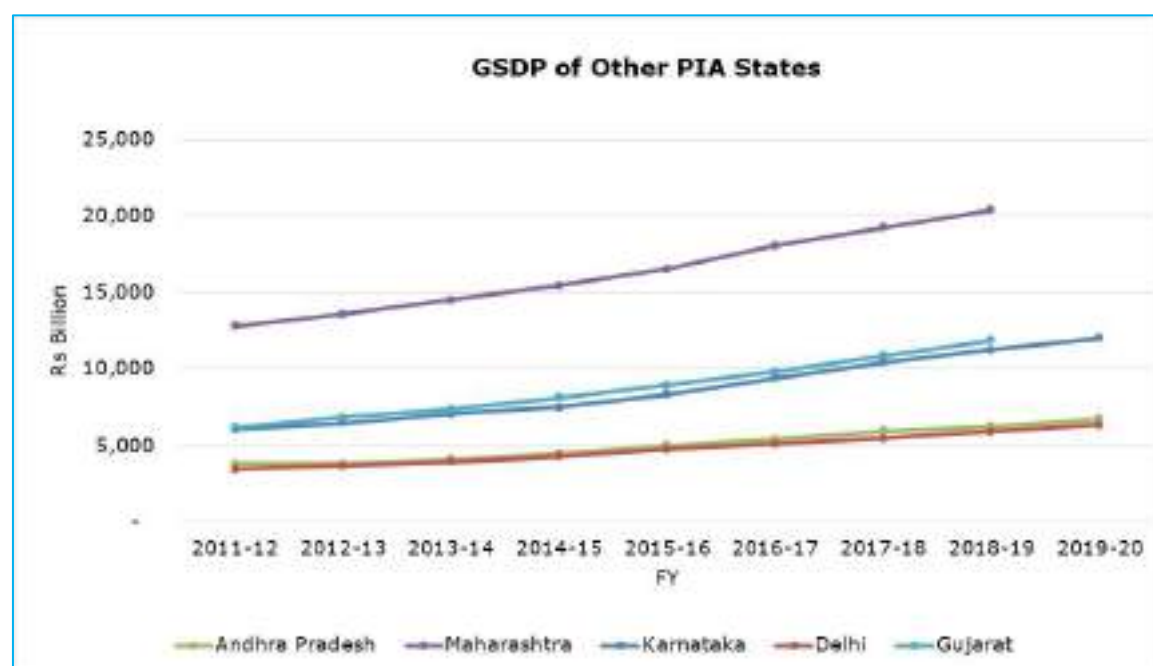
- The state of Gujarat has shown a growth of 9.8 percent since FY12 to FY19 with a GSDP of Rs 11,863 billion in FY19.
- The services sector is the largest contributor to GSDP of the PIA states, 43.5 percent in Andhra Pradesh, 55.9 percent in Maharashtra and 64.4 percent in Karnataka. Delhi has a service sector share of around 13 percent in FY20 and 47 percent in the state of Gujarat (FY19).

The average annual growth rates as obtained using regression analysis till the last available year (FY12-FY20) are presented in **Table 3-8**.

Particular/States	Andhra Pradesh	Maharashtra (FY12-FY19)	Karnataka	Delhi	Gujarat (FY12-FY19)
GSDP	8.2	8.5	9.5	8.2	9.8
Primary	9.2	3.0	3.2	0.8	6.8
Secondary	5.9	8.3	8.2	8.0	11.2
Tertiary	7.7	9.7	10.3	8.2	8.4
Construction	4.6	5.0	3.5	5.4	3.1
Per Capita Income	7.5	7.2	8.3	6.0	8.2

**Table 3-8: Average Annual Growth Rates (%) of State Income for Other PIA States**

The GSDP over the years for the states of Andhra Pradesh, Maharashtra, Karnataka, Delhi and Gujarat are presented in **Figure 3-8**.



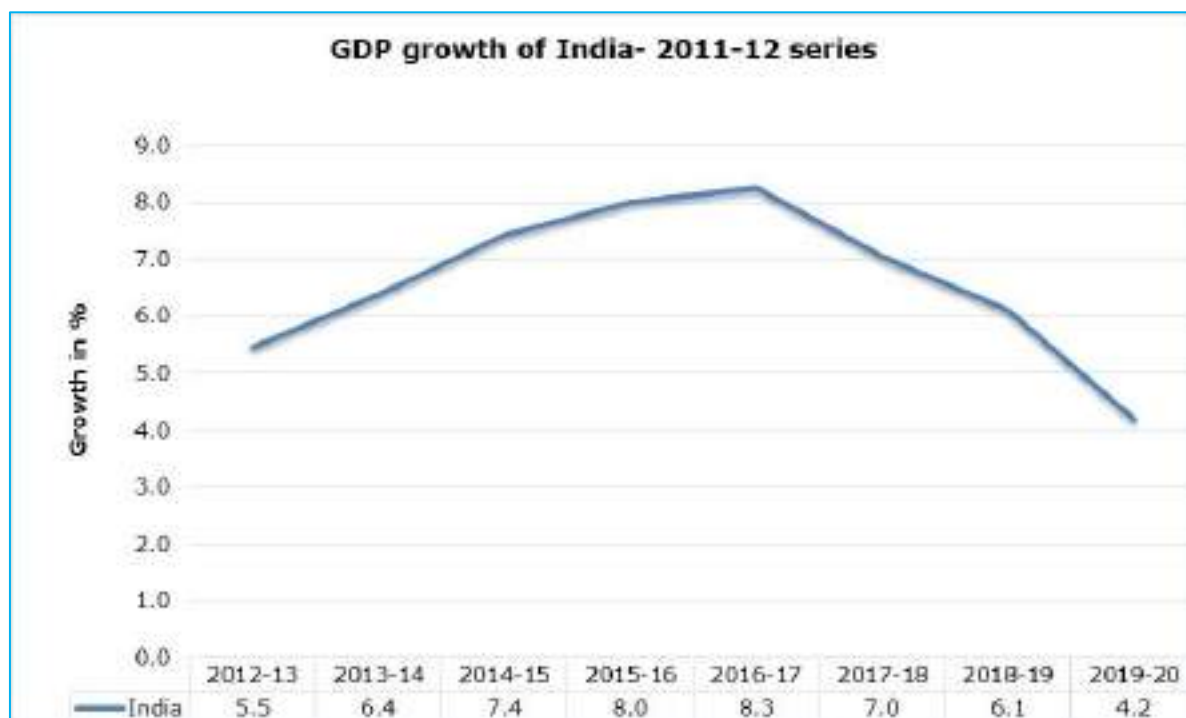
**Figure 3-8: GSDP (in Rs billion) for Other PIA States**

### 3.9 India and PIA Outlook

#### 3.9.1 India's Past Performance and Outlook for Future

India's growth trend during the recent years has been presented in **Figure 3-9**.





**Figure 3-9: GDP Growth in India**

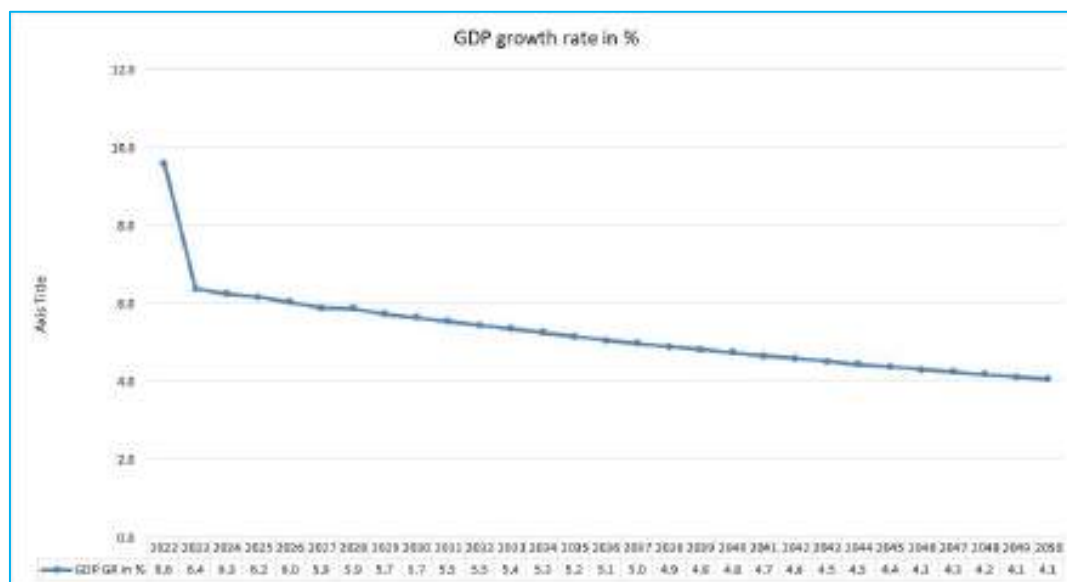
Economic growth in India has been broadly on an accelerating path till FY18. It is likely to be the fastest growing major economy in the world in the medium-term. The growth in real GDP was 8.3 percent for FY17 and 7.0 percent in FY18, while the growth in FY19 was slightly lower at 6.1 percent. The long-term trend line growth of 7.2 percent has been achieved between FY12 to FY19. During FY20, growth has slowed down due to some structural issues and global headwinds resulting in an average GDP growth rate of 4.2 percent.

With the outbreak of COVID-19, global recession is likely to be witnessed across all the economies. The lockdown period announced by Indian government had an adverse impact on the economy. The first quarter estimated for FY21 has indicated a contraction of 23.9 percent, second quarter showed a rebound in growth by contracting 7.5 percent and third quarter grew by 0.4 percent. The forecast for next quarter is expected to be positive growth with economic activities picking up. The resultant contraction for FY21 is expected to be around 7 to 8 percent.

The Indian economy is likely to see the impact of global slowdown due to COVID-19 and hence, the GDP forecast for India by various international agencies has been revised for the next two years. ICRA, Moody and SBI have recently predicted a growth of around -9 to -11 percent for FY21. S&P has predicted -7 percent for FY21 and a strong revival in FY22 with a likely growth of 10 percent. The forecast by IMF on January 26, 2021 for FY21 is -8 percent, 11 percent for FY22 and 6.8 percent for FY23. World Bank on October 9, 2020 has forecasted a growth of around -9.6 percent for FY21 and 5.4 percent for FY22. As per ADB's latest update (December 20), India's GDP is expected to grow by -8 percent in 2021 and 8 percent in FY22. Organisation for Economic Cooperation and Development (OECD) has forecasted the GDP growth to be around -7.4 percent in FY21

and 12.6 percent for FY22. As per latest Economic Survey of India, the economy is predicted to have a growth rate of 10-12 percent for FY22, 6.5 percent in FY23 and 7 percent in FY24.

In light of the outlook being predicted by various agencies for the current years and likely revival thereafter spread over a couple of years, the year on year growth for Indian economy has been adopted from Consensus Economics forecast till 2050 and presented in **Figure 3-9**.



**Figure 3-10: GDP Forecast of India by Consensus Economics**

### 3.9.2 PIA States Outlook

A snapshot of the main economic indicators in the past and the growth adopted for future for the PIA state is presented in **Table 3-9**.

Indicators/States	Telangana	Andhra Pradesh	Maharashtra (FY19)	Karnataka	Delhi	Gujarat (FY19)
GSDP in Rs Billion	6,633	6,720	20,391	12,010	6,344	10,187
GSDP growth (2011/12 to last year) in %	8.5	8.2	8.5	9.5	8.2	9.8
Per capita Income in Rs (FY20)	171,642	130,130	167,581	179,149	316,650	175,630
Sector share in %, FY20						
Agriculture and allied	16.0	34.4	13.1	9.4	2.0	17.1
Industry	18.7	22.1	31.0	26.2	13.5	47.0
Services	65.3	43.5	55.9	64.4	84.6	35.9

**Table 3-9: Main Economic Indicators of PIA States**

Income estimates are available till FY20 for all the PIA states except Maharashtra and Gujarat. The income growth of PIA states of Maharashtra and Gujarat as observed in the past years (FY12 to FY19) is assumed to continue for FY20. In order to arrive at the forecast of the PIA states, past performance of the State GDPs vis-a-vis India GDP has been studied and the multipliers have been derived for both short term and long term. A reality check is done in the background as to whether adoption of these applicable growth

rates for all the states of India lead to achieving the overall target set for India as a whole. The adopted multipliers along with the implied Indian economy/ PIA states' outlook under different time periods are presented in **Table 3-10**.

Period	India	Telangan	Andhra Pradesh	Maharashtra	Karnataka	Delhi	Gujarat
<b>Past growth %</b>							
2011-12 to 2019-20	7.0	8.5	8.1	7.1	9.5	8.2	9.3
2014-15 to 2019-20	7.0	9.7	8.3	7.3	10.1	8.0	9.2
<b>Past Multipliers vis-a-vis India</b>							
2011-12 to 2019-20	1.21	1.15	1.00	1.35	1.17	1.33	
2014-15 to 2019-20	1.40	1.19	1.06	1.46	1.15	1.32	
<b>Multipliers adopted for future</b>							
States w.r.t. India	1.20	1.20	1.00	1.20	1.10	1.20	

**Table 3-10: Past Multipliers and Future Outlook of PIA States**

Based on the normalised OD shares of the toll plaza and the outlooks adopted for PIA states, the mode-wise future weighted income is presented in **Table 3-11**.

Period/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2022	10.92	11.29	10.76	11.08	11.12	11.09
2023	7.26	7.51	7.16	7.37	7.39	7.37
2024	7.12	7.36	7.02	7.23	7.25	7.23
2025	7.02	7.25	6.92	7.12	7.15	7.13
2026	6.87	7.10	6.77	6.98	7.00	6.98
2027	6.71	6.93	6.61	6.81	6.83	6.81
2028	6.69	6.91	6.59	6.79	6.81	6.79
2029	6.52	6.74	6.43	6.62	6.64	6.62
2030	6.43	6.64	6.33	6.53	6.55	6.53
2031	6.31	6.52	6.22	6.41	6.43	6.41
2032	6.20	6.41	6.11	6.29	6.31	6.29
2033	6.10	6.31	6.01	6.19	6.21	6.19
2034	6.00	6.20	5.91	6.09	6.11	6.09
2035	5.87	6.07	5.79	5.96	5.98	5.96
2036	5.77	5.96	5.68	5.86	5.87	5.86
2037	5.67	5.86	5.58	5.75	5.77	5.75
2038	5.58	5.77	5.50	5.67	5.68	5.67
2039	5.49	5.68	5.41	5.58	5.59	5.58
2040	5.41	5.59	5.33	5.49	5.51	5.49
2041	5.32	5.50	5.24	5.40	5.41	5.40
2042	5.23	5.41	5.15	5.31	5.33	5.31
2043	5.15	5.32	5.07	5.23	5.24	5.23
2044	5.06	5.23	4.99	5.14	5.15	5.14
2045	4.99	5.16	4.92	5.07	5.08	5.07
2046	4.92	5.08	4.84	4.99	5.01	4.99

Period/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2047	4.84	5.00	4.77	4.91	4.93	4.92
2048	4.77	4.93	4.70	4.84	4.85	4.84
2049	4.70	4.85	4.63	4.77	4.78	4.77
2050	4.63	4.78	4.56	4.70	4.71	4.70

**Table 3-11: Future Mode-wise Weighted Income of PIA States**

### 3.10 Review of Past Traffic Data

Past traffic data was available for the toll plaza location and from IHMCL count stations. A comparison of the adopted AADT for FY21 with the past toll data is presented in **Table 3-12**.

FY/Mode	Car	LCV	BUS/2A	3A	MAV
FY17	6,031	1,918	2,158	1,566	1,335
FY18	6,304	1,972	1,987	1,572	1,812
FY19	5,718	1,903	2,101	1,463	2,093
FY20	6,537	1,855	2,326	1,306	2,151
FY21	7,464	1,913	2,443	1,236	2,345
<b>YOY growth in %</b>					
FY18 vs FY17	4.5	2.8	-7.9	0.4	35.8
FY19 vs FY18	-9.3	-3.5	5.7	-6.9	15.5
FY20 vs FY19	17.7	-2.4	14.2	-8.1	5.8
FY21 vs FY20	10.9	3.0	1.8	-8.1	5.8

**Table 3-12: Past Traffic Comparison from Pullur Toll Plaza Data**

The comparison of the past data shows a double-digit growth in cars between FY19 and FY20 at the toll plaza location. LCVs have shown a negative growth in the past which could be due to some classification issue between MLCV and LCVs. The growth in Bus/2A trucks has been 6-14 percent in FY19 and FY20. MAVs have shown a positive and high growth in the past with 3A trucks showing a decline with the combined growth of around 2.6% for 3A and MAV.

The traffic data available from IHMCL count stations is available for eight months between FY16 and FY21. The counts have been classified into respective financial years and converted into AADT by applying SCF from FY18 data for Pullur toll Plaza. The Year on Year AADT and growth is presented in **Table 3-13**.

FY/Mode	Car	LCV	BUS/2A	3A	MAV
FY16	4,648	2,200	2,085	1,924	1,281
FY18	6,268	2,616	2,091	2,224	2,031
FY19	5,289	2,795	1,806	1,841	2,108
FY20	6,651	3,198	2,085	1,838	2,413
FY21	6,022	2,995	743	1,192	2,325
<b>YOY growth</b>					
FY18 vs FY16	16.1	9.0	0.1	7.5	25.9
FY19 vs FY18	-15.6	6.8	-13.6	-17.2	3.8
FY20 vs FY19	25.8	14.4	15.4	-0.2	14.5
FY21 vs FY20	-9.5	-6.4	-64.4	-35.2	-3.6

**Table 3-13: Past Traffic Comparison from IHMCL AADT**

No clear trend is visible in the year on year comparisons made between IHMCL traffic data.

The comparison of the counts of Avanza study of FY18 and FY21 is presented in **Table 3-14**.

FY/MODE	Car	LCV	Bus	2A	3 Axle Truck	MAV
FY18	5,837	1,915	942	1,797	2,426	1,850
FY21	10,271	2,409	1,037	1,609	1,423	3,119
CAGR	20.7%	8.0%	3.3%	-3.6%	-16.3%	19.0%

**Table 3-14 : Avanza Counts of FY18 vs FY21**

The comparison of two sets shows a robust car growth of around 20 percent. LCVs have grown at 8 percent during these three years. A negative growth has been observed in 2A and 3A trucks which could be attributed to the tonnages shifts happening on the national highways across India. MAVs show a double-digit growth between FY18 and FY21. The combined growth of 3A and MAV is around 2 percent.

### 3.11 Past and Future Transport Demand Elasticity

The econometric model applied for the project, relates traffic growth to changes in state domestic product via an elasticity factor according to IRC guidelines. The elasticity by vehicle types have been estimated based on the regression analysis of weighted income of PIA states with the actual traffic data.

A regression between weighted GSDP (as independent variable) and weighted registered vehicles (as dependant variable) of PIA states was carried out. The registered vehicle elasticity in case of cars is 1.32 during FY12 to FY17. In case of all trucks combined, the registered vehicle elasticity is 0.86 during the same period. For buses, an elasticity of 0.66 has been derived for FY12 to FY17 period.

Vehicle registration data is also used as a proxy wherein operational toll data is not available. Vehicle registration data represents all vehicles registered in the state, but does not indicate actual number of vehicles plying on the road as it does not account for factors such vehicles taken off the road due to lack road worthiness, those registered in a state but mostly used elsewhere, etc. Consequently, the elasticity values based on vehicle registration may not be representative of the traffic growth trends on the project road.

Also, the elasticity values from the adjacent sections of WATL and JEPL have been assessed in forming the project road future elasticities. The end point elasticities observed in WATL and JEPL over the past years is presented in **Table 3-15** and **Table 3-16**.

FY/Mode	Car	LCV	BUS	2A	MAV	2A/3A/MAVs
FY11 to FY20	1.80	0.18	0.01	0.31	0.87	0.71
FY11 to FY15	2.13	1.16	-0.68	-1.63	0.58	-0.03
FY15 to FY20	1.56	-0.34	0.57	1.54	0.71	1.06



**Table 3-15: Past Elasticities on WATL**

In case of WATL, Car elasticity has been around 1.56 from FY15 to FY20. 2A trucks has shown an elasticity of 1.5 during the same period. Combined elasticity value for 2A/3A/MAV is observed to be around 1.0.

FY/Mode	Car/Jeep/van	LCV/ Minibus	Truck/Bus	MAV
FY11 vs FY20	1.28	0.38	0.01	0.50
FY12 vs FY15	1.80	1.09	-1.03	0.00
FY16 vs FY20	1.08	-0.07	0.71	0.59

**Table 3-16: Past Elasticities on JEPL**

In case of JEPL, Car elasticity is around 1.0 from FY16 to FY20. Bus/2A trucks has shown an elasticity of 0.7 during the same period. In case of 3A/MAV combined an elasticity value of 0.6 has been observed between FY16 and FY20.

The past elasticity values from the past toll data and IHMCL traffic data are also presented in **Table 3-17**.

FY/Mode	Car	LCV	Truck/BUS	3A	MAV
<b>Past toll data</b>					
FY20 vs FY17	0.40	-0.11	0.39	-0.52	1.96
FY20 vs FY18	0.56	-0.09	0.68	-0.69	0.99
<b>IHMCL AADT</b>					
FY21 vs FY16	0.59	0.69	-2.04	-0.95	1.35
FY20 vs FY18	0.29	0.98	-0.01	-0.84	0.85

**Table 3-17: Past Elasticities from Toll Data and IHMCL**

### Cars

- In case of cars, the elasticity values derived across the adjacent toll roads is between 1.0 to 1.5. The elasticities and the past growth levels for cars are a result of increasing income levels, increasing vehicle ownership, and higher propensity to travel on highways in India due to network level developments and higher levels of service. These levels of growth are likely to continue in the near to medium term since car ownership levels are still very low and the road network is undergoing continual development. Car elasticity has been considered as 1.0 for the period up to FY30 and tapered to 0.9 for the rest of years till 2050.
- The motorisation levels in India also play an important role in determining car growth. With the increasing car ownership levels, propensity to travel and network level improvements on National Highways, car growth is likely to be at a high rate as witnessed in the recent past. The low motorization rate suggests that there is room for continued growth for many years to come. The motorisation rate for cars (per

1000 population) in India has gone up from 6.6 in 2001 to 20 in 2015. Although India's car fleet has been growing at 10% for nearly 25 years, its motorization rate is low compared to other countries of similar wealth and much lower than developed countries with motorization rate of around 450. The forecasts by different agencies indicate that number of cars will increase to 35 per thousand populations by 2025. With the continual increase in motorization rate and improved road network usage by cars for inter-urban travel, car growth is expected to be robust.

- It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 and further tapering has been done in the next slab.

### **Bus/Truck**

- Over the years in India, there has been a change in passenger's travel mode preferences with increasingly more people shifting from public transport systems towards personalised modes. This has resulted, in general, in elasticity of bus traffic/demand to GSDP lower than unity ranging between 0.3 to 0.7 across the operational National Highways.
- The toll plaza data shows a past elasticity of 0.39 in FY17 to FY20 comparison in combined Bus/Truck category. 2A trucks have also shown a positive growth in the past in the adjacent toll section of WATL. Going forward Bus and Truck elasticity has been recommended as 0.3 till 2050.

### **Trucks**

- For smaller axle trucks like MLCV/LCV, a higher elasticity value of 0.5 has been adopted till FY30 and 0.4 for the remaining period till 2050. The adjacent sections of WATL and JEPL have shown an elasticity ranging between 0.2 and 0.4 during the long-term period of FY11 to FY20. MLCVs are being charged here in LCV category, however, the switch between MLCV and LCV is being observed across other national highways wherein MLCVs have been gaining importance lately over LCV category.
- The project road toll plaza data for 3A/MAV has shown an elasticity of 0.75 in FY18 and FY20 comparison. WATL also shows an elasticity of 0.87 over the long term of FY11 to FY20. For 3A/MAV category, an elasticity of 0.3 has been adopted for 3A trucks and 0.9 for MAV trucks till FY30 indicating a combined elasticity of 0.7.

It is likely that this growth would slow down over time as the market becomes more mature and saturated, therefore elasticity to GSDP can be expected to decline over time. With the anticipated growth momentum in the coming years, higher elasticity values have been considered for the slab up to FY30 for Cars, LCV & MAV and further tapering has been done in the next slab.

In India as a whole, the freight vehicle mix has been changing in the last decade favouring MAV to 2 Axle/ 3Axle vehicles for long-distance traffic, given the operational efficiencies achievable with larger vehicles. Considering the ongoing technical advancements in automobile industry, some of the standard 2 Axle/ 3 Axle trucks would gradually be replaced by MAVs. Mature national highways with tolling in operation for few years, have already witnessed the shift in 2A/3A trucks to MAV for long distance movement and some of the 2A trucks are still being used for local movements.

The changing trend is clearly visible in the sales of trucks. Demand for the traditional 16T and 25T rigid trucks is declining while segments like 31T and 37T rigid trucks and 35T, 40T and 49T tractor-trailers are gaining major traction. In fact, the 37T multi-axle rigid truck segment is one of the fastest growing segments in HCVs.

As per SIAM, LCV goods carrier have shown a growth of 25 percent in FY17 to FY19 and M&HCV rigid/ trailer trucks witnessed a growth of around 17 percent during the same period. However, all the vehicles have shown a double-digit negative growth in FY20 due to the economic slowdown, COVID 19 and technology disruption in the form of compliance to Bharat Stage VI norms etc.

On an overall level, due consideration has been given to the tonnage shifts happening in the market with Mini LCV gaining importance for short distance movements over LCVs and MAVs being preferred over 2A/3A for long distance movements due to better operational efficiencies. Some of the 2A/3A trucks are also being used for local movements.

While assigning elasticities to different modes, freight travel pattern and over all elasticity of cargo tonnage with respect to weighted GSDP has been an important consideration. The recommended elasticity values adopted for all vehicle types in line with the traffic growth being observed on other national highways and changes in freight traffic pattern observed on the project road are presented in **Table 3-18**.

Period/Modes	Car/MLCV	LCV/Mini Bus	Bus	Truck	3A	MAV
FY22	1.0	0.5	0.3	0.3	0.3	0.9
FY23-FY25	1.0	0.5	0.3	0.3	0.3	0.9
FY26-FY30	1.0	0.5	0.3	0.3	0.3	0.9
FY31-FY35	0.9	0.4	0.3	0.3	0.3	0.8
Beyond FY35	0.9	0.4	0.3	0.3	0.3	0.8

**Table 3-18: Recommended Elasticity for Project Road**

### 3.12 Projected Traffic Growth Rates

Based on the moderated perspective elasticity values and the projected growth rates of the income for PIA states, the future average annual compound traffic growth rates by vehicle type have been estimated for the project road by using the following relationship:

$Tgr = (GSDPgr) \times E$ ; where,

Tgr – Traffic growth rate for mode

GSDPgr – Growth rate of GSDP

E – Elasticity value for mode

Using the year on year mode wise weighted income for PIA and elasticity for different time periods, traffic growth rates have been estimated for each year till FY50. The estimated traffic growth rates for the project road have been presented in **Table 3-19**.

FY/Modes	Car/MLCV	LCV/M Bus	Bus	Truck	3A	MAV
2022	10.9	5.6	3.2	3.3	3.3	10.0
2023	7.3	3.8	2.1	2.2	2.2	6.6
2024	7.1	3.7	2.1	2.2	2.2	6.5
2025	7.0	3.6	2.1	2.1	2.1	6.4
2026	6.9	3.6	2.0	2.1	2.1	6.3
2027	6.7	3.5	2.0	2.0	2.0	6.1
2028	6.7	3.5	2.0	2.0	2.0	6.1
2029	6.5	3.4	1.9	2.0	2.0	6.0
2030	6.4	3.3	1.9	2.0	2.0	5.9
2031	5.7	2.6	1.9	1.9	1.9	5.1
2032	5.6	2.6	1.8	1.9	1.9	5.0
2033	5.5	2.5	1.8	1.9	1.9	5.0
2034	5.4	2.5	1.8	1.8	1.8	4.9
2035	5.3	2.4	1.7	1.8	1.8	4.8
2036	5.2	2.4	1.7	1.8	1.8	4.7
2037	5.1	2.3	1.7	1.7	1.7	4.6
2038	5.0	2.3	1.6	1.7	1.7	4.5
2039	4.9	2.3	1.6	1.7	1.7	4.5
2040	4.9	2.2	1.6	1.6	1.7	4.4
2041	4.8	2.2	1.6	1.6	1.6	4.3
2042	4.7	2.2	1.5	1.6	1.6	4.2
2043	4.6	2.1	1.5	1.6	1.6	4.2
2044	4.6	2.1	1.5	1.5	1.5	4.1
2045	4.5	2.1	1.5	1.5	1.5	4.1
2046	4.4	2.0	1.5	1.5	1.5	4.0
2047	4.4	2.0	1.4	1.5	1.5	3.9
2048	4.3	2.0	1.4	1.5	1.5	3.9
2049	4.2	1.9	1.4	1.4	1.4	3.8
2050	4.2	1.9	1.4	1.4	1.4	3.8

**Table 3-19: Projected Traffic Growth Rates for Project Road (%)**

In derivation of above growth rates, the likely shift of buses to cars in case of passenger vehicles and the replacement/ tonnage shift of 2A/3A trucks to MAV for long distance in case of freight vehicles has been duly considered. Adopting these growth rates for 3A and MAV, the resultant market share of 3A goes down to 18 percent from the current level of 35 percent on the project road. Based on the above growth rates, the average cargo growth (tonnage) is likely to be around 4.0 percent till the end of 2050 and the overall cargo elasticity is estimated to be 0.66.

The above growth rates relate to the most likely Base Case. In addition, two sets of traffic growth rates under low and high cases have also been considered and impact on toll

revenue evaluated for both these cases. A growth rate of 200 basis point (2 per cent) lower than base case, for all types of vehicles modes has been considered in low growth scenario. A 100-basis point higher traffic growth rate than the base case has been considered for high growth scenario.

### 3.13 Traffic Projections and Capacity Analysis

**Table 3-20** presents the projections of the total vehicles based on the most likely growth rates till FY50 as assessed in this study.

FY	Total traffic
2021	31,920
2022	34,314
2023	36,049
2024	37,854
2025	39,738
2026	41,690
2027	43,707
2028	45,831
2029	48,021
2030	50,299
2031	52,423
2032	54,610
2033	56,864
2034	59,185
2035	61,561
2036	64,001
2037	66,507
2038	69,082
2039	71,728
2040	74,445
2041	77,228
2042	80,080
2043	83,003
2044	85,994
2045	89,059
2046	92,199
2047	95,411
2048	98,696
2049	102,054
2050	105,485

**Table 3-20: Projected Traffic at Kothakota-Kurnool**

As per the latest information related to draft InvIT CA, the six laning augmentation is done after 40,000 PCUs are reached for four consecutive years. Based on the projected traffic using the recommended Base Case growth rates, the project road traffic on Kothakotta-Kurnool is likely to reach 40,000 PCUs in FY26 and will continue to be above 40,000 PCUs for further three consecutive years till 2029 after which NHA I may invite bids for DPR preparation.

The projected traffic for the project road is likely to reach designed capacity of 60,000 PCU for 4 lane in FY35.



## 4. TOLL REVENUE PROJECTIONS

### 4.1 Tolling Strategy

Generally, in toll road projects, "Open System" of toll collection is specified. As the project road has an existing alignment and there are several roads joining the highway, an open tolling system is implemented on the project road. This enables the concessionaire to collect tolls from through traffic as well as from short distance one.

As mentioned earlier, one toll plaza is operational on the Kothakotta-Kurnool road with an effective tolling length of 92.432 km.

### 4.2 Schedule of User Fee

As per Schedule of User Fee for the project, the per km toll rates applicable from 2007-08 for normal tolling length and permanent structures, the revision basis and concessions are provided.

The concessions to traffic have been given in the form of rates as below:

#### Local traffic

Car / Jeep / Vans - includes local users owning a vehicle registered for non-commercial purposes, residing within a distance of 20 km from the toll plaza and crossing the same for commuting purposes. The discounted fee for these users is currently a monthly pass of Rs. 275.00

Commercial vehicles - includes local users owning a commercial vehicle (excluding vehicles under National Permit), registered with address on the Registration Certificate of a particular district and uses such vehicle for commuting on a section of National Highway, permanent bridge, tunnel or bypass, as the case may be, which is located within that district, shall be levied user fee on all toll plazas which are located within that district at the rate of fifty per cent of the prescribed rate of fee (single journey rate). No such concession shall be provided, if a service road or alternative road is available for use by such commercial vehicles. Thus, local commercial traffic has to pay only 50 percent of the normal ticket.

#### Daily Pass

When the vehicle has to cross the tolled section more than once in a day, the user shall have the option to pay one and half times (1.5 times) of the fee for a single entry; this pass shall be valid for 2 entries within 24 hours of purchase.

#### Monthly Pass

A user, who makes use of the project road frequently during a month, may opt to purchase a monthly pass upon payment of a charge equal to two-thirds of the fee payable for 50 single journeys; this pass can be used for a maximum 50 one-way journeys over the month of validity.

Thus, the different categories of toll tickets are as follows:

- (i) Traffic paying normal toll rates (single trip)
- (ii) Traffic paying return journey rates
- (iii) Traffic paying monthly pass rates
- (iv) Traffic paying local personal rates
- (v) Traffic paying local commercial rates

### 4.3 Tolling Streams

In line with the above categories of toll payments, a segmentation of total traffic was assessed from the toll data for the year quarter 4 of FY19 (Jan19 to March 19), FY20 and three quarters of FY21 (April 20-Dec 20). There has been a variation in the exemption traffic of buses across the three sets of data available. As per the information available from the toll plaza, the high exemptions are a result of the fast tag category vehicles which cross the toll plaza and do not have balance in their wallet. These buses are being classified under exempt. Therefore, it was considered prudent to use the distribution available from Q4 of FY19 and exemptions percentage for buses was adjusted as per the trends on other national highways. The distribution adopted for the present study is presented in **Table 4-1**.

Ticket Type/Modes	Car	LCV	Bus	2A Truck	3A Truck	MAV
Single	53.3	59.3	19.6	86.3	85.0	94.0
Return	37.2	37.6	76.6	9.9	10.4	2.5
Monthly Pass						
Local personal						
Local commercial	0.7	0.0	0.0	0.0	0.0	0.2
Exempt	8.9	3.1	3.8	3.7	4.7	3.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 4-1: Tolling Distribution (incl. Exemptions & Violations) from Q4 of FY19 (%)**

The paying traffic for the year FY21 has been worked out by deducting the toll exempt percentage from base AADT and is presented in **Table 4-2**.

Particular/Mode	Car	LCV	Bus	2A Truck	3A Truck	MAV
Base AADT including toll exempted vehicles	7,464	1,911	940	1,502	1,236	2,345
% of Exemptions/ Violations	8.9	3.1	3.8	3.7	4.7	3.2
Paying Traffic	6,801	1,852	904	1,446	1,178	2,270

**Table 4-2: Toll Paying Traffic, FY21**

The tolling stream distribution excluding exemptions and violations for the paying traffic is presented in **Table 4-3**.

Ticket Type/Modes	Car	LCV	Bus	2 A Truck	3 A Truck	4-6 A Truck
Single	58.5	61.2	20.4	89.7	89.1	97.2
Return	40.8	38.8	79.6	10.3	10.9	2.6
Monthly Pass	0.0	0.0	0.0	0.0	0.0	0.0
Local personal	0.0	0.0	0.0	0.0	0.0	0.0
Local commercial	0.7	0.0	0.0	0.0	0.0	0.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 4-3: Tolling Distribution (excl. Exemptions and Violations), FY21 (%)**

In case of cars, the normal toll paying traffic is likely to be about 58.5 percent. Daily Pass traffic has a share of 40.8 percent. Local commercial traffic is minimal in cars. In case of LCV, around 61 percent of the traffic is paying for single ticket and 39 percent are opting for daily pass. In case of 3A/MAV, around 90-97 percent of the truck traffic is opting for normal pass due to their long lead of travel with around 11 percent of 3A trucks and 3 percent of MAV falling under return pass category.

Trip rate for local pass users is considered as 1.0, for monthly pass it is 1.67 across all modes. For daily pass, trip rate of 2.0 has been considered for all the modes.

#### 4.4 Toll Rates

This section presents details on the toll rates that are likely to be imposed on the users of the project road during the study period. The toll rates (Rs/km) for the base year 2007-08 for different vehicle categories as per toll fee rules are presented in **Table 4-4**.

Mode	Base rate per km (in Rs)
Car, Jeep, Van, LMV	0.65
LCV /M Bus	1.05
Bus/ 2 Axle Truck	2.20
3 Axle	2.40
MAV	3.45
Oversized	4.20

**Table 4-4: Toll Rates in Rs/km for Different Vehicle Categories**

The toll notification states that the 2007 toll rates shall be increased without compounding by three per cent each year with effect from the 1st day of April 2008 and such increased rate shall be deemed to be the base rate for the subsequent years.

In addition to this, the rate of fee for use of bypass forming part of a section of a National Highway constructed with a cost of Rs 10 crore or more, for the base year 2007, shall be one and a half times of the per km base rates specified above and the length of such bypass shall be excluded from the length of such section of National Highway.

In addition to this, the fee levied and collected hereunder for permanent bridge/ structures, as the case may be, having a length of 60 m or more on the basis of the equivalent length for structure as specified shall be due and payable at the toll plaza.

In case of the project road, the details of normal tolling lengths, bypass length (at 1.5 times) and equivalent structure lengths being charged at Pullur toll plaza are presented in **Table 4-5**.

	Kothakota-Kurnool
A. Normal length	69.857
B. Bypass length @ 1.5 times	2.95
C. Equivalent Structure length	18.15
D. Total tolling length=(A+1.5*B+C)	92.432

**Table 4-5: Tolling Lengths at Kothakota-Kurnool**

The effective tolling length is 92.432 at this toll plaza. The applicable base rates shall be revised annually with effect from April 1 each year to reflect the increase in wholesale price index for the month of December of the immediate preceding year in which sub revision is undertaken but such revision shall be restricted for 40 per cent of the increase in wholesale price index.

Actual WPI information for December 2020 of 124.5 under 2011-12 series converted into 1999-00 series ( $124.5 \times 1.873 \times 1.641 = 382.7$ ) has been used. In view of the past inflation trend, the forecast for WPI has been considered as 3.5 percent for the period till 2050 in light of the past growth trend since 2011.

As per the applicable tolling notifications for six laning, during construction period, the toll rates will be charged at 75 percent of the applicable tolling length during construction and kept constant till full COD is achieved. The construction period for six laning for this project is likely to be from FY32 to FY33 during which the toll rates will be 75 percent of the applicable toll rates of FY32 and will be constant for FY33.

The stream of toll rates to be charged at the toll plaza of the project road for different years till 2050 is presented in **Table 4-6**. The table also presents the constant toll rates to be charged during the construction period applicable in the scenario with six laning of the project section. The toll fee has been rounded to nearest 5 Rupees as per toll fee rules.

FY End	Car	LCV/M Bus	Bus/2A	3A	MAV	OSV	Car Local
Toll rates in Rs							
2021	110	180	375	410	585	715	275
2022	115	185	385	420	605	735	285
2023	120	190	400	435	630	765	295
2024	125	200	415	455	655	795	310
2025	130	205	435	475	680	830	320
2026	135	215	450	490	710	860	335
2027	140	225	470	510	735	895	345
2028	145	235	490	535	765	935	360
2029	150	245	510	555	795	970	375
2030	155	250	530	575	830	1,010	390
2031	160	260	550	600	860	1,050	405
2032	170	275	570	625	895	1,090	420
2033	175	285	595	650	930	1,135	440
2034	185	295	620	675	970	1,180	455
2035	190	305	645	700	1,010	1,230	475
2036	200	320	670	730	1,050	1,275	495
2037	205	330	695	760	1,090	1,330	515
2038	215	345	725	790	1,135	1,380	535

FY End	Car	LCV/M Bus	Bus/2A	3A	MAV	OSV	Car Local
2039	220	360	750	820	1,180	1,435	555
2040	230	375	780	855	1,225	1,495	575
2041	240	390	815	885	1,275	1,555	600
2042	250	405	845	925	1,325	1,615	625
2043	260	420	880	960	1,380	1,680	650
2044	270	435	915	1,000	1,435	1,745	675
2045	280	455	950	1,040	1,490	1,815	700
2046	290	470	990	1,080	1,550	1,890	730
2047	305	490	1,030	1,125	1,615	1,965	760
2048	315	510	1,070	1,170	1,680	2,045	790
2049	330	530	1,115	1,215	1,745	2,125	820
2050	340	555	1,160	1,265	1,815	2,210	855
<b>Scenario with six laning construction- Applicable toll rates</b>							
2032	125	205	430	470	670	820	315
2033	125	205	430	470	670	820	315

**Table 4-6: Toll Rates at Toll Plaza (in Rs)**

The users purchasing return journey tickets will pay 1.5 times the above toll rates; the traffic opting for monthly passes will pay 33.3 times (two-thirds of 50 single journeys) the normal traffic toll rates. All passes have been rounded to the nearest 5 Rupees as per fee rules.

#### 4.5 Toll Revenue Estimates

The projections of revenue for the project road has been presented till 2050. Toll revenue streams have been calculated assuming that:

- Toll would be collected for all 365 days in a year and for 366 days in a leap year
- Toll revenues have been presented from FY22 to FY50

Two scenarios have been presented under revenue estimation:

- Base Case considers an unconstrained growth without any consideration for six laning augmentation
- As per the latest information related to draft InvIT CA, scenario with six laning augmentation considers the six laning augmentation after 40,000 PCUs are reached for four consecutive years (FY26 to FY29), assigning two years for DPR preparation (FY30 and FY31) and two years for construction of six laning (FY32 to FY33). The toll rates are charged at 75 percent of the applicable tolling length during construction and kept constant till full COD is achieved

The mode wise breakdown of toll revenue for the project road for the base case is presented in **Table 4-7**.



FY End	Car	LCV	Bus	2A	3A	MAV	Total Revenue
2022	281.7	118.9	105.4	204.7	181.6	547.0	1,439.3
2023	317.0	127.1	111.5	217.3	192.3	607.4	1,572.6
2024	352.0	138.7	118.4	230.4	205.4	672.6	1,717.5
2025	390.2	147.7	126.0	246.5	219.0	743.1	1,872.5
2026	435.0	160.4	133.4	260.4	230.9	824.5	2,044.5
2027	483.5	172.9	142.0	277.5	245.2	906.0	2,227.1
2028	532.0	186.8	151.0	295.2	262.3	1,000.6	2,428.0
2029	588.7	201.3	159.4	313.2	277.5	1,101.8	2,642.0
2030	649.9	213.7	169.7	332.0	293.3	1,217.8	2,876.4
2031	711.3	228.0	179.3	351.2	311.9	1,326.7	3,108.4
2032	792.3	245.8	190.1	371.0	331.0	1,450.1	3,380.3
2033	863.3	261.2	200.7	394.2	350.7	1,581.6	3,651.6
2034	955.6	278.1	212.5	418.2	370.8	1,729.8	3,964.9
2035	1,036.6	294.5	225.3	442.9	391.5	1,887.0	4,277.8
2036	1,141.2	315.8	238.5	468.3	415.4	2,053.7	4,632.9
2037	1,240.1	334.3	252.0	494.2	440.0	2,230.1	4,990.7
2038	1,358.2	357.0	266.3	524.1	465.2	2,427.3	5,398.1
2039	1,470.1	380.4	281.3	551.6	490.9	2,636.2	5,810.6
2040	1,603.5	404.5	297.2	583.1	520.3	2,857.1	6,265.7
2041	1,753.2	429.4	314.0	618.8	547.4	3,102.2	6,765.0
2042	1,912.3	456.2	331.6	652.0	581.1	3,360.8	7,293.9
2043	2,080.9	483.8	350.0	689.5	612.7	3,646.5	7,863.6
2044	2,259.4	512.2	369.9	728.1	647.9	3,947.7	8,465.3
2045	2,448.3	545.5	390.2	767.6	684.1	4,265.4	9,101.1
2046	2,658.4	576.9	411.5	811.6	721.3	4,614.4	9,794.1
2047	2,900.7	612.1	434.2	856.9	762.4	4,996.6	10,562.8
2048	3,136.3	649.7	457.4	903.1	804.3	5,399.1	11,349.8
2049	3,418.0	689.6	482.8	954.4	847.5	5,822.0	12,214.3
2050	3,680.6	733.8	509.7	1,007.0	894.7	6,283.0	13,108.8

**Table 4-7: Toll Revenue (in Rs crore) for Kothakotta-Kurnool by Mode**

Cars represent around 24 percent share in total revenue with Buses having a share of 5.4 percent only. Amongst the freight vehicles category, MAVs represent the highest share of around 43.7 percent of total revenue. 3A trucks account for a share of 9.3 percent, LCVs and 2A trucks have a share of 7.0 percent and 10.5 respectively.

#### 4.6 Scenario Analysis

For toll road projects, revenue streams are generally based on the assessment of the traffic volume (base and future) crossing the toll plazas and the applicable toll imposed on the user of the road. There is an inherent element of uncertainty in any forecast and whilst is not possible to measure risk in a strictly statistical sense (as many of the risks are largely or partly unknown), in this section an attempt is made at quantifying the main risks that could have an impact on this forecast.

The econometric approach used to derive traffic growth, is based on the estimation of GSDP growth rates for the influence area economies and traffic demand elasticity by mode; the estimation of both variables contains a certain degree of uncertainty which can be represented in the scenario analysis. Scenario analysis has been done in the following subheadings for the base case:

### **High Case**

The high case is based on a more optimistic economic outlook for future years as compared than the base case and therefore, based on traffic growth rates of 100 basis points (1 per cent) higher than the base case for every year and for all modes.

### **Low Case**

A growth rate of 200 basis point (2 percent) lower than base case for all types of vehicles has been considered in the present analysis to reflect uncertainty with regard to economic performance of PIA states.

### **Scenario with Six-laning Augmentation**

This scenario considers the construction of six laning during FY32 to FY33, accordingly, toll rates have been considered as 75% of the applicable toll rates of FY32 and kept constant for FY33.

The results of different scenarios are presented in **Table 4-8**. A comparison versus base case has been presented for the Present Value of the project (at 12 per cent discount rate) and the compounded annual growth rate (CAGR) from FY22 to FY50.

<b>FY End</b>	<b>Base Case</b>	<b>High Case</b>	<b>Low Case</b>	<b>Scenario with Six laning augmentation</b>
2022	1,439.3	1,452.7	1,412.5	1,439.3
2023	1,572.6	1,602.3	1,513.9	1,572.6
2024	1,717.5	1,766.7	1,622.0	1,717.5
2025	1,872.5	1,944.4	1,734.7	1,872.5
2026	2,044.5	2,143.3	1,858.0	2,044.5
2027	2,227.1	2,356.9	1,985.4	2,227.1
2028	2,428.0	2,593.9	2,123.2	2,428.0
2029	2,642.0	2,849.5	2,266.4	2,642.0
2030	2,876.4	3,131.8	2,420.5	2,876.4
2031	3,108.4	3,416.8	2,565.6	3,108.4
2032	3,380.3	3,751.2	2,736.6	2,525.4
2033	3,651.6	4,091.2	2,899.6	2,628.3
2034	3,964.9	4,484.7	3,088.1	3,964.9
2035	4,277.8	4,885.0	3,267.9	4,277.8
2036	4,632.9	5,341.3	3,471.3	4,632.9
2037	4,990.7	5,809.0	3,667.6	4,990.7
2038	5,398.1	6,343.5	3,890.9	5,398.1
2039	5,810.6	6,893.8	4,107.8	5,810.6
2040	6,265.7	7,505.2	4,344.4	6,265.7
2041	6,765.0	8,181.0	4,600.5	6,765.0
2042	7,293.9	8,905.5	4,864.8	7,293.9
2043	7,863.6	9,693.3	5,143.9	7,863.6
2044	8,465.3	10,535.4	5,431.0	8,465.3
2045	9,101.1	11,435.8	5,726.6	9,101.1
2046	9,794.1	12,424.9	6,044.0	9,794.1
2047	10,562.8	13,529.1	6,392.9	10,562.8

FY End	Base Case	High Case	Low Case	Scenario with Six laning augmentation
2048	11,349.8	14,677.2	6,736.8	11,349.8
2049	12,214.3	15,947.4	7,110.3	12,214.3
2050	13,108.8	17,280.3	7,483.7	13,108.8
PV12	24,981	28,250	19,820	24,473
PV12 vs base		13.1%	-20.7%	-2.0%
CAGR FY22 to FY50	8.2%	9.2%	6.1%	8.2%

**Table 4-8: Comparison of Annual Revenues Forecasts in Rs Millions (Base) to Alternate Traffic Growth Assumptions**

The low growth scenario has a negative impact on revenue PV of about 20 percent versus base case (till FY50), whilst the optimistic growth scenario would generate about 13.1 percent higher PV than the base case. Scenario with six lane augmentation would have a lower PV of 2.0 percent.

The project road revenues will have a CAGR of 8.2 percent for the period up to FY50.

## NOTE ON TRAFFIC AND REVENUE ESTIMATES

Project name **Independent Review of Traffic Feasibility Study for Chittorgarh Kota and Kothakotta Kurnool**

Client **NATIONAL HIGHWAYS INFRA INVESTMENT MANAGERS PRIVATE LIMITED**

Prepared by **Harpreet Kaur**

Checked by **Meenakshi Asija**

Approved by **Srinivas Chekuri**



Date September 02, 2021

Ramboll  
The Epitome  
Building No.5, Tower-B  
Floor-17  
DLF Cyber Terrace Phase-III  
Gurgaon-122 002  
India

T +91 124 4611 999  
F +91 124 4611 998  
<https://mea.ramboll.com>

## Note on Traffic and Revenue Estimates Based on Recent Data

NHIIMPL has appointed Ramboll India Private Ltd as a traffic consultant to carry out independent review of the Base Report of Chittorgarh-Kota section of NH-27 and Kothakota-Kurnool section of NH-44 (carried out by AVANZA) to assess the present traffic levels, travel pattern and revenue estimation for the project, duly considering the network characteristics and future economic perspective in the influence area of the projects. The reports covering all these aspects were submitted in the month of March 2021. NHIIMPL has provided the data from January 2021 to nine days of August 2021 and has requested to provide a note covering the impact of these recent data points on the projections presented in the Report, if any. This note presents the six-month traffic data and revenue received from NHIIMPL for both the projects and the recommendations thereafter.

The estimates of traffic and revenue presented in the Traffic Study Reports dated March 2021 for the projects of Chittorgarh-Kota (CK) and Kothakota-Kurnool (KK) assume that FY22 will be a year of economic recovery after being impacted by COVID 19 in FY21 and thus, does not consider any further impact on the traffic and revenue estimates of FY22. However, the second wave of COVID 2.0 has hit the economy in the initial months of FY22 with local curfews/ state-wide lockdowns being imposed in different parts of the country. This has led to the revenue/traffic being lower in the first quarter of FY22 and the actual revenue of FY22 would be lower than the estimates in the Reports.

It is worth mentioning here, in FY21, the initial months have been badly impacted due to strict country wide lockdowns and showed a higher recovery in the following months catering to the pent-up demand for few months and stabilizing at a higher level thereafter, FY22 is also likely to witness a similar trend. However, the impact in FY22 is not likely to be the same due to less intensive lockdowns.

The month-on-month traffic profile for the three toll plazas of CK is presented in **Figure 1**.



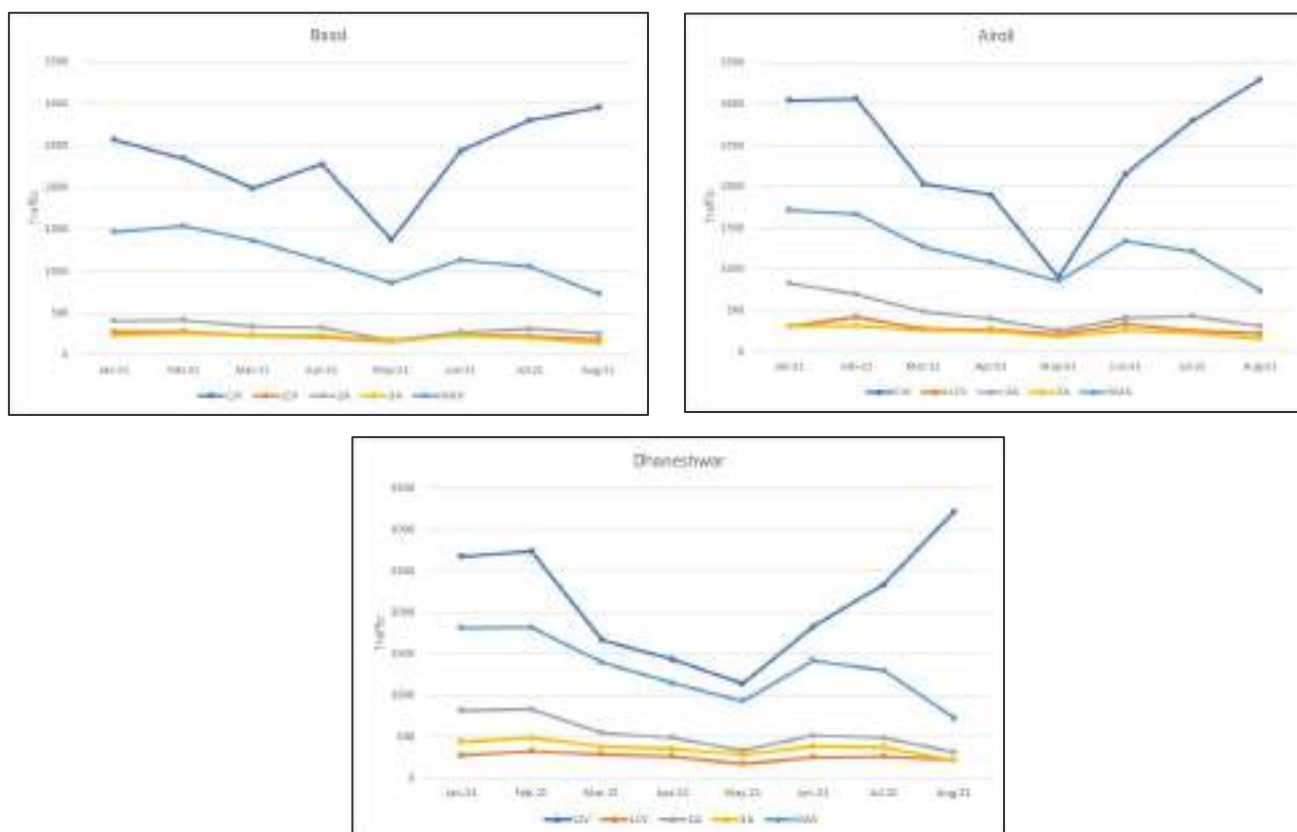
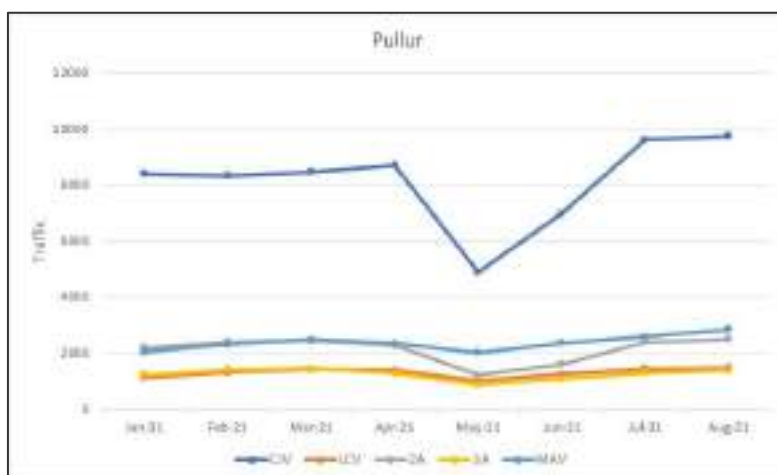


Figure 1: Traffic Profile from January to August 2021-CK

In case of Chittorgarh-Kota (CK), the traffic and revenue on project road in Q1 of FY22 and the resultant revenue has been impacted by state-wide lockdowns/ curfews imposed in view of second wave of COVID. The month of July and data of first nine days of August shows a recovery in passenger traffic, but freight traffic is yet to pick up. This could be attributed to the closure of mines in the surrounding region due to rainy season leading to flooding in the some of the mines. As per the site information, the traffic levels are currently low due to impact of monsoons and will pick up after monsoons.

In case of Kothakota-Kurnool (KK), the traffic and revenue in Q1 of FY22 on the project road has been moderately impacted in the months of May and June due to lockdowns owing to the second wave of COVID. The month-on-month traffic profile is presented in **Figure 2**.



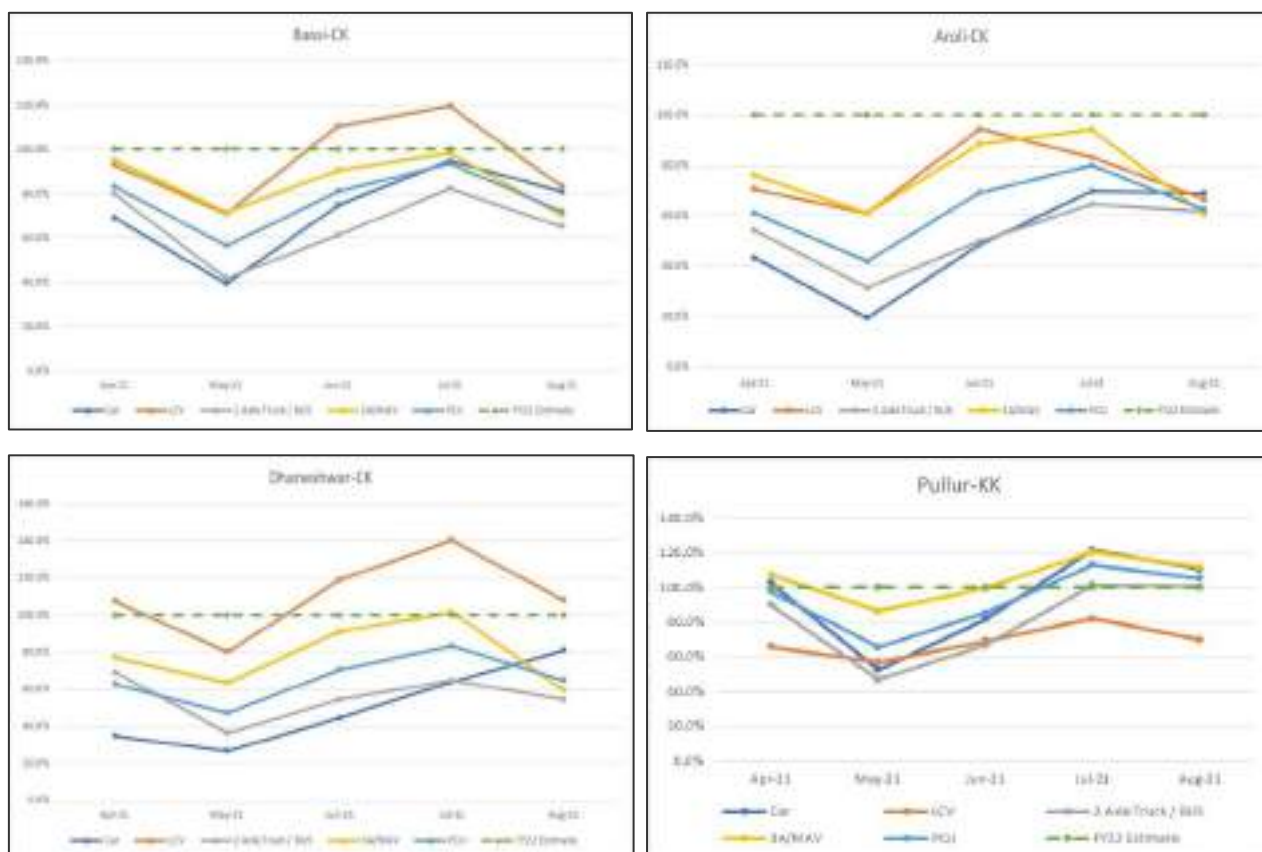
**Figure 2: Traffic Profile from January to August 2021-KK**

The monthly traffic and revenue from January to August 2021 received recently for the two projects has been presented in **Annexure 1**. Also, tolling segmentation has been provided from January-July 2021 for both the assets. Since the months of April-June have been impacted by the second wave of COVID, the month of July is considered to be an appropriate representation of the tolling segmentation for both the projects which has been presented in **Annexure 2**.

The traffic data in CK for FY22 from April to July shows the impact of second wave of COVID. The month of July shows the recovery in passenger vehicles with opening of economic activities and freight vehicles still shows a lower traffic level.

In KK also, the ADT for three months of FY22 has been analyzed. This asset was only impacted for the month of May and June 2021 by COVID 2.0. The month of July shows a strong recovery in both passenger and freight traffic which could be due to some pent-up demand after relaxation of lockdowns.

The variation of actual traffic of April to August against month-on-month seasonalized estimate for FY22 for each mode is presented in **Figure 3**.



**Figure 3: Actual Traffic vs FY22 Estimate**

Since April to June 2021 were impacted in both the projects, the seasonalized AADT for FY22 is based on the July ADT for CK and KK. The projected traffic for FY23 using the growth rates is estimated. The AADT for FY22 and projections for FY23 are presented in **Table 1**.

Toll Plaza	Car	LCV	2 Axle Truck / BUS	3 Axle Truck	MAV	PCUs
<b>CK-AADT</b>						
<b>Bassi</b>						
FY22	3,046	254	341	227	1,197	10,515
FY23	3,243	266	351	237	1,272	11,130
<b>Aroli</b>						
FY22	3,107	279	468	253	1,338	11,711
FY23	3,308	291	482	264	1,423	12,387
<b>Dhaneshwar</b>						
FY22	2,684	298	544	423	1,477	12,683
FY23	2,857	311	561	442	1,571	13,401
<b>KK-AADT</b>						
FY22	10,060	1,655	2,563	1,549	3,097	38,813
FY23	10,791	1,717	2,619	1,584	3,302	40,833

**Table 1: FY22 and FY23 AADT for CK and KK**

The traffic levels in H2 of FY22 may get further impacted by the third wave of COVID (likely in the months of October-November), however, with envisaged improvement in vaccinating population, the impact of this wave might not be that severe.

With the recent increase in WPI over last few months, the WPI forecast for the month of December 2022 (FY23) is likely to be 9.2 percent (as per RBI's quarterly estimate of WPI) as against the earlier considered figure of 3.5 percent in the report.

The forecasted revenue for H2 of FY22 and FY23 based on the July AADT for FY22, tolling segmentation of July 2021 and revised WPI for FY23 is presented in **Table 2**.

	Toll Revenue	Toll Revenue in Report	Absolute Gain/Loss	Variation from Report
<b>CK</b>				
H2 FY22	411.4	530.1	-118.8	-28.9%
FY23	930.7	1170.2	-239.5	-25.7%
<b>KK</b>				
H2 FY22	828.8	719.7	109.1	13.2%
FY23	1864.5	1572.6	291.9	15.7%
<b>Total of Two Assets</b>				
H2 FY22	1240.1	1249.8	-9.6	-0.8%
FY23	2795.2	2742.8	52.4	1.9%

**Table 2: Revenue Estimates for Both Assets in Rs Million**

The toll revenue for these two projects together based on July AADT are likely to be lower from the earlier revenue by 0.8 percent in H2 of FY22 and higher by 1.9 percent in FY23. As indicated, the traffic in CK for the month of July is yet to pick up (esp. for freight vehicles due to closure of mines in rainy season) and in case of KK, it shows some amount of pent-up demand. On basis of this analysis, it can be confirmed that the previous estimates of traffic and revenue for these assets provided in March 2021 report for FY23 and beyond can still be considered as valid.

## **ANNEXURE**



**ANNEXURE -1**  
**PAST TRAFFIC & REVENUE**

## Independent Review of Traffic Feasibility Study for Chittorgarh -Kota in the state of Rajasthan

## Month wise Traffic

Bassi TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	PCUs
Jan-21	2,567	274	410	237	1,470	4	11,553
Feb-21	2,347	279	416	261	1,536	4	11,725
Mar-21	1,989	226	336	233	1,361	3	10,176
Apr-21	2,275	211	324	227	1,129	2	9,335
May-21	1,370	156	178	169	858	6	6,533
Jun-21	2,432	241	268	226	1,133	4	9,393
Jul-21	2,801	218	309	199	1,051	1	9,389
Aug-21	2,951	182	254	142	733	1	7,716

Aroli TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	PCUs
Jan-21	3,039	310	828	310	1,713	4	14,644
Feb-21	3,056	417	695	309	1,662	4	14,194
Mar-21	2,028	277	481	259	1,267	3	10,376
Apr-21	1,894	268	400	243	1,080	2	9,093
May-21	902	214	258	185	854	6	6,421
Jun-21	2,150	335	409	261	1,336	4	10,689
Jul-21	2,797	255	425	228	1,208	1	10,580
Aug-21	3,295	217	310	157	740	1	8,357

Dhaneshwar TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	PCUs
Jan-21	2,676	274	813	442	1,813	4	15,031
Feb-21	2,738	327	829	481	1,815	4	15,344
Mar-21	1,670	285	545	379	1,394	2	11,153
Apr-21	1,434	260	488	348	1,147	2	9,504
May-21	1,136	171	333	282	928	5	7,436
Jun-21	1,825	247	512	385	1,420	3	11,288
Jul-21	2,333	260	486	372	1,299	1	11,147
Aug-21	3,216	215	310	209	724	1	8,361

**Independent Review of Traffic Feasibility Study for Kothakota - Kurnool in the state of Telangana/Andhra Pradesh**  
**Month wise Traffic**

Pullur TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	PCUs
Jan-21	8,423	1,139	2,205	1,228	2,046	3	29,649
Feb-21	8,349	1,319	2,397	1,400	2,316	2	32,150
Mar-21	8,493	1,428	2,462	1,457	2,483	2	33,576
Apr-21	8,724	1,393	2,280	1,278	2,355	2	32,097
May-21	4,900	1,031	1,211	893	2,019	1	21,850
Jun-21	6,998	1,253	1,617	1,081	2,376	2	27,670
Jul-21	9,632	1,440	2,403	1,297	2,592	2	34,562
Aug-21	9,757	1,474	2,504	1,387	2,846	2	36,453

## Independent Review of Traffic Feasibility Study for Chittorgarh -Kota in the state of Rajasthan

## Month wise Revenue in Cr

Bassi TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	Total
Jan-21	0.37	0.08	0.28	0.18	1.59	0.01	2.50
Feb-21	0.33	0.08	0.25	0.17	1.49	0.00	2.34
Mar-21	0.33	0.07	0.22	0.18	1.49	0.00	2.29
Apr-21	0.27	0.06	0.21	0.18	1.28	0.00	2.00
May-21	0.13	0.05	0.13	0.14	1.02	0.01	1.47
Jun-21	0.28	0.07	0.18	0.17	1.29	0.00	2.00
Jul-21	0.39	0.07	0.21	0.16	1.23	0.00	2.06
Aug-21	0.13	0.02	0.05	0.04	0.26	0.00	0.49

Aroli TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	Total
Jan-21	0.39	0.09	0.52	0.21	1.73	0.00	2.95
Feb-21	0.40	0.11	0.42	0.19	1.52	0.00	2.65
Mar-21	0.36	0.08	0.31	0.17	1.26	0.00	2.20
Apr-21	0.29	0.07	0.23	0.16	1.08	0.00	1.83
May-21	0.12	0.05	0.15	0.13	0.88	0.01	1.33
Jun-21	0.29	0.07	0.23	0.17	1.30	0.00	2.06
Jul-21	0.38	0.07	0.25	0.16	1.22	0.00	2.09
Aug-21	0.14	0.02	0.06	0.03	0.23	0.00	0.48

Dhaneshwar TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	Total
Jan-21	0.35	0.08	0.48	0.29	1.77	0.01	2.99
Feb-21	0.35	0.09	0.44	0.29	1.58	0.00	2.77
Mar-21	0.32	0.09	0.30	0.24	1.30	0.00	2.25
Apr-21	0.26	0.07	0.27	0.22	1.08	0.00	1.90
May-21	0.12	0.05	0.19	0.18	0.89	0.01	1.43
Jun-21	0.26	0.06	0.27	0.23	1.30	0.00	2.13
Jul-21	0.32	0.07	0.28	0.23	1.23	0.00	2.13
Aug-21	0.09	0.02	0.05	0.04	0.21	0.00	0.42

**Independent Review of Traffic Feasibility Study for Kothakota - Kurnool in the state of Telangana/Andhra Pradesh**  
**Month wise Revenue in Cr**

Pullur TP							
FY22	CJV	LCV	2A	3A	MAV	OSV	Total
Jan-21	2.41	0.64	2.26	1.54	3.62	0.01	10.48
Feb-21	2.11	0.65	2.21	1.57	3.70	0.00	10.25
Mar-21	2.38	0.78	2.53	1.81	4.40	0.00	11.90
Apr-21	2.47	0.71	2.31	1.56	4.18	0.00	11.24
May-21	1.34	0.54	1.35	1.14	3.71	0.00	8.08
Jun-21	1.94	0.64	1.74	1.34	4.22	0.00	9.88
Jul-21	2.78	0.77	2.57	1.65	4.76	0.00	12.54
Aug-21	0.82	0.23	0.77	0.51	1.51	0.00	3.85



**ANNEXURE -2**  
**TRAFFIC SEGMENTATION**

Independent Review of Traffic Feasibility Study for Chittorgarh -Kota in the state of Rajasthan

Traffic Segmentation

Bassi TP							
Jul-21	CJV	LCV	Bus	2A	3A	MAV	OSV
Single	30.7	40.6	41.6	41.6	57.3	72.9	100.0
Return	29.9	48.0	49.3	49.3	39.3	15.6	
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	
Local personal	0.0			0.0			
Local commercial	0.0	0.8	7.1	7.1	1.6	10.0	
Exempt	39.3	10.6	2.1	2.1	1.9	1.6	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Aroli TP							
Jul-21	CJV	LCV	Bus	2A	3A	MAV	OSV
Single	35.1	39.8	37.4	37.4	56.9	63.9	100.0
Return	36.8	53.9	61.9	61.9	42.5	35.8	
Monthly	0.0	0.0	0.0		0.0	0.0	
Local personal	0.0						
Local commercial	0.0	1.2	0.0	0.0	0.0	0.0	
Exempt	28.1	5.1	0.8	0.8	0.7	0.3	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Dhaneshwar TP							
Jul-21	CJV	LCV	Bus	2A	3A	MAV	OSV
Single	36.9	39.9	33.1	33.1	36.9	52.8	100.0
Return	37.5	59.6	64.4	64.4	61.5	46.1	
Monthly	0.0	0.0	0.0	0.0	0.0	0.0	
Local personal	0.0			0.0			
Local commercial	0.0	0.1	2.3	2.3	1.3	1.0	
Exempt	25.6	0.4	0.2	0.2	0.3	0.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Independent Review of Traffic Feasibility Study for Kothakota - Kurnool in the state of Telangana/Andhra Pradesh

Traffic Segmentation

Jul-21	Pullur TP						
	CJV	LCV	Bus	2A	3A	MAV	OSV
Single	47.9	68.4	57.9	57.9	90.0	92.0	100.0
Return	40.7	31.5	42.0	42.0	9.9	7.9	
Monthly	0.0	0.0	0.1	0.1	0.0	0.0	
Local personal	7.7			0.0			
Local commercial	0.0	0.0	0.0	0.0	0.0	0.0	
Exempt	3.8	0.1	0.1	0.1	0.1	0.1	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

## **ANNEXURE D**

### **TECHNICAL CLARIFICATIONS ON THE CONCESSION AGREEMENTS**

*(The remainder of this page has intentionally been kept blank)*



# भारतीय राष्ट्रीय राजमार्ग प्राधिकरण

(सड़क परिवहन और राजमार्ग मंत्रालय)

## National Highways Authority of India

(Ministry of Road Transport and Highways)

जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली - 110 075

G-5 & 6, Sector-10, Dwarka, New Delhi-110075

दूरभाष / Phone : 91-11-25074100/25074200

NHAI/13013/2021-22/InvIT/IM / 10847

23<sup>rd</sup> September, 2021

To,

MD & CEO NHIIMPL  
NHAI Corporate Office,  
G-5 & 6, Dwarka Sector 10,  
New Delhi - 110075

**Subject:** Replies to the queries of prospective investors - InvIT - Reg.

**Ref:** Perspective Investor's queries received from time to time

Sir,

Responses to the queries of prospective Investors shared with NHAI from time to time are enclosed as Annex.

Encl: As above

  
(Santosh K Bajpai)  
DGM (T)  
InvIT Division

Copy to:

- (i) CGM (T) - Sh. Ashish Asati
- (ii) CGM (F) - Sh. B.M. Rao
- (iii) GM (F&A) - Sh. Subhash Khurana
- (iv) GM (F) - Sh. S.Q. Ahmad



Reply to investor's query for Investor's Due Diligence		
Annexure A.Kothakota Kurnool		
	Query	Reply
1	3 MMR cycles are considered as follows:  Year 2029-2030 2042-2043 2048-2049  Cost Rs. 83.16 104.47 108.59	Considering proposed Major Maintenance in year 2048-49, no major Maintenance has been considered in the financial assumptions at handing over in 2051.
2	No cost is considered at Handing over in 2051.	
3	6 Laning of the Asset is considered between 2036-38 with a DLP of 5 Years. Gap between 1st and 2nd MMR cycles is 12 years with an assumption of 6 laning in between. In case the capacity augmentation is delayed by 2-3 years, the impact of same may need to be addressed.	Capacity Augmmmentation shall be carried out as per provisions of the Article 14.  Impact assessment is required to be carried out by the Bidders/ Invetors on their own.
4	During the DLP period, would the MM costs and R&M costs for the entire project be carried out by the EPC contractor at its own cost?	Yes.
5	What is the impact of tolling after 6 laning as the project has major bridges to be constructed? (Tollable length will get increased depending on Bridge>60m length)	As per Clause 14.1.4 of the Concession Agreement, "the Concessionaire shall be entitled to collect and appropriate the additional revenues from the augmented stretch."
6	Proposed Approach Cross section with RE wall for approaches at grade separators is not included in scope	Concessionaire has to build the grade separators including approaches with RE wall etc. all complete.
7	Length of approach at grade separators is not included in schedules	
8	Is there any Plan & Profile developed for approaches of grade separators? May please provide the same. Actual length of approach should be based on Plan/Profile drawings.	The Concessionaire is required to carry out detailed engineering and all other acitivities incidental to complete the obligations defined in the Concession Agreement.
9	CAD file of Lidar data may please be provided. Only PDF is available.	Again provided. Refer following Link <a href="https://drive.google.com/drive/folders/1w1fjpc5_haujZBsfdO69uKLR6BWBMWn1?usp=sharing">https://drive.google.com/drive/folders/1w1fjpc5_haujZBsfdO69uKLR6BWBMWn1?usp=sharing</a>
10	Proposed Pavement Crust thickness to be adopted for all the new approaches is not mentioned in scope. Only pavement crust for service road is included.	Crust composition shall be same as Main Carriageway.
11	Couple of locations service road work is in progress but the same is missing in Schedule-A and schedule-B. Request you provide the complete details of new proposal which are planned to execute before handing over the site to Concessionaire so that the future MM Cost can be worked out considering the additional paved areas	1. Km. 140.100 to Km. 140.570 – 470 M - LHS 2. Km. 140.100 to Km. 140.260 – 160 M – RHS 3. Km. 145.100 to Km. 145.280 – 180 M – LHS 4. Km. 160.890 to Km. 161.320 – 430 M – RHS 5. Km. 169.320 to Km. 169.800 – 480 M – LHS 6. Km. 169.320 to Km. 169.720 – 400 M – RHS 7. Km. 201.000 to Km. 202.000 – 1000 M- BHS 8. Km. 204.700 to Km. 205.830 – 1130 M – LHS 9. Km. 204.700 to Km. 205.800 – 1100 M- RHS
12	The existing service road width is not matching as given in schedule-A for example the service road width in Kurnool town at existing flyover locations is 12.0m on both sides where as it is given as 7.0m in schedule-A. Some other locations width of Service Road is mentioned as 5.5m, whereas on ground it is between 4.5-5.2m. Request you update the existing inventory details as per site.	details of widening of existing service road have been provided at clause 1.2 of schedule-B.  Issue of existing service road, if any, shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.

	Query	Reply
13	Widening of Existing service road on outer side may require reconstruction of Drain/footpath. It may be possible on inner side where there some utilities. Please provide a TCS for widening of SR.	Widening of Service Roads shall be carried out as per Clause 1.2 of Annex - 1 of Schedule B.
14	New VUP structure is completed at Km 207.153 but the approaches work is in progress, the same is missing in schedule-A. Please include the same. Similarly New VUP at Km 210.880 and its approaches is under construction. Request you provide the details for the same such Structural span details and approach length details and width details etc.	VUP at Km. 207+153 is mentioned in Schedule A of structures. Span is 1 X 30 m VUP Approach Start chainage (towards Hyd side) : 210.440 VUP Approach End chainage (towards Bangalore side): 211.070
15	New VUP work is in progress at Km 210.814 and the new proposed approach work is also in progress at this location. From the site it appears that the proposed approach towards Bangalore side is extending beyond project end point. Request you to clarify about exact end pint of the project road. Also request you to clarify the maintenances scope of the approach beyond project road end point	The Project Highway starts from km 135.469 and ends at km 211.000 of NH - 44.
16	New VUP is proposed at Km 136+200 and due to this new VUP, new service road/slip road is proposed from Km 135.850 to Km 136.550 and additional Minor bridge is proposed at Km 136.167 on both LHS and RHS Service Roads. The existing Minor bridge on Main Carriageway at Km 136.167 requires reconstruction due to additional fill of proposed VUP Approach. But Schedule-B is silent about this, please clarify.	Site shall be handed over to the Concessionaire on "as is where is" basis.
17	New VUP is proposed at Km 153+000 and due to this new VUP, new service road/slip road is proposed from Km 153.650 to 153.350 and additional Minor bridges are proposed at Km 153.555 and at Km 153.830 on both LHS and RHS Service Roads. The existing Minor bridges on Main Carriageway at Km 152.795 and at Km 153.280 requires reconstruction due to additional fill of proposed VUP Approach. But Schedule-B is silent about this, please clarify.	As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
18	New VUP is proposed at Km 202.800 and both side new service road is proposed between Km 202.450 to Km 202.800 (Both Sides) on A1 side and 202.800 to 202.900 (100m) on LHS Side. The existing junction at this location is at high elevation falling in the approaches of major bridge. The proposed conceptual plan/Profile for the VUP at Km 202.800 and its approaches at this location is essential to understand the exact scope particularly the retaining walls arrangement and reconstruction of existing Mian carriageway/SR if any. Please provide the Conceptual Plan/Profile of this VUP.	The Concessionaire is required to carry out detailed engineering and all other acitivities incidental to complete the obligations complying with the Specifications and Standards defined in the Concession Agreement.
19	New Service Road is proposed between Km 151.000 and Km 152.800 (refer S.No 8 in table in clause 1.1 of Schedule-B) on LHS but once again New Service Road is given between Km 152.650 to Km 153.350 (refer S.No 9 in table in clause 1.1 of Schedule-B). there is overlap of chainage between Km 152.650 to 152.800). Please clarify.	Issue of existing service road (i. e. negative Change of Scope) , if any, shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.
20	Span of flyover is considered as 30m, where as 15+30+15 or 2x30 may be required based on ground conditions.	15m+30m+15m

	Query	Reply
21	Scope for ATMS appears to be open as mentions that existing guidelines are vogue and it should be provided as per new guidelines which are likely to be developed in near future. What are the implications of cost for same? What is considered now under invit model to account for ambiguity in the same. Exact scope for ATMS may be specified in schedules.	ATMS shall be developed, maintained and operated as per the scope defoned in the Concession Agreement. Requisite cost implication has already been considered in the Financial assumptions.
22	Widening of Some existing service roads is included in scope, but entry/exit ramps are not considered at existing service road locations. Please confirm the same. Requirement of widening of CD structures falling under extended length of entry/exit may also require to be included.	Entry/exit ramps and widening of CD structures are under the scope of the Concessionaire.
23	Widening of exiting service road at some locations require reconstruction of drain. The same is missing.	Site shall be handed over to the Concessionaire on "as is where is" basis.
24	Existing Bus Bay/Bus shelters are getting disturbed in construction of new service roads/flyovers. Scope for reconstruction of same is missing.	As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
25	Availability of Encumbrance free ROW for proposed improvements at junctions/Underpasses/Service Road locations may please be confirmed / informed.	RoW shall be provided to the Concessionaire as per Article 10 of the Concession Agreement.
26	Requirement of shifting of Utilities/major underground utilities and status of s	Utility Shifting, if required, shall be carried out as per provisions of the Concession Agreement.
27	Details of 6 laning structure (post capacity augmentation) is not clarified	Capacity Augmmmentation shall be carried out as per provisions of the Article 14.

Reply to Investor's queries for investor's due diligence		
Annexure B. Belgaum - Kagal		
Sl.No	Description	Reply
	3 MMR cycles are considered as follows:	
	Year Cost	
1	2034-2035 42.84	Considering proposed Major maintenance in the year 2046-47, no cost for major maintenance has been considered in the financial assumptions for the year 2051.
	2040-2041 42.84	
	2046-2047 42.84	
2	No cost is considered at Handing over in 2051?	
3	As per Schedule-B Operation and Maintenance of Project highway during construction of six laning for entire construction period and five years defect liability period after construction shall be under the scope of proposed contractor for construction of 6 laning of Project Highway. Whereas no MMR is considered till 10 years from six laning. Please clarify. Is DLP 5 years or 10 years?	Proposed DLP is 10 years.
4	6 Laning of the Asset is considered between 2022-24 with a DLP of 10 Years. Is MMR and routine maintenance costs also part of EPC contractor for 6 laning?	Yes.
	Is it required to consider any major maintenance cost in 2029?	No.
5	No MMR is considered for Flexible Pavement/Rigid pavement of MCW. Only Routine maintenance of rigid pavement for entire length of 78 Km is considered. We understand the flexible pavement is getting converted/reconstructed with rigid pavement during 6 laning. Please confirm the same. Scope of MMR for Flexible pavement (Service Road, Bus Bays/Truck layby) after 5 years of DLP of EPC contractor may please be elaborated.	The EPC Contractor shall maintain the Project Highway for a period of 10 years, corresponding to the Defects Liability Period commencing from the date of the Completion Certificate.
6	In case the capacity augmentation is delayed by 2-3 years, the impact of same may need to be addressed.  What is the impact of tolling after 6 laning as the project has major bridges to be constructed? (Tollable length will get increased depending on Bridge > 60m length)  If the capacity augmentation is delayed and hence if the toll is not revised, how the concessionaire will get protected?	Impact assessment is required to be carried out by the Bidders/ Invetors on their own.  As per Clause 14.1.4 of the Concession Agreement, "the Concessionaire shall be entitled to collect and appropriate the additional revenues from the augmented stretch."  The issue shall be dealt as per the provisions of the Concession Agreement, refer Article 27 and 28 of the Concession Agreement.
7	Scope of work for Maintenance work: Please confirm structures which are not getting widened as part of six laning will also be under the obligation of EPC contractor till end of DLP (10 Years). Does his scope include replacement/repairs/rehabilitation of existing bridges also?	Yes.
8	Existing toll plaza are also being upgraded as per NHAI latest circular as part of 6 laning? Details of equipment available at existing toll plaza that are being upgraded as part of 6 laning may please be provided for better understanding the scope for maintenance.	Bids for Capacity Aumentation have already been invited through e-tendering portal ( <a href="https://etenders.gov.in/">https://etenders.gov.in/</a> ) as per following details:  1. 6 laning from Belgaum to Sankeshwar Bypass from Km. 515.000 to Km. 555.017 of NH-48 in the state of Karnataka on EPC mode (Package-I) Tender id: 2021_NHAI_85137_1  2. 6 laning from Sankeshwar Bypass to MH-KNT Border from Km. 555.017 to Km. 592.853 of NH-48 in the state of Karnataka on EPC mode (Package-II) Tender id: 2021_NHAI_85144_1  Documents uploaded on etendering portal may be referred to.
9	Does scope for ATMS is also part of 6 laning with EPC contractor? It is also mentioned as part of sch-B. Please confirm. Scope for ATMS appears to be open as mentions that existing guidelines are vogue and it should be provided as per new guidelines which are likely to be developed in near future. What are the implications of cost for same? What is considered now under invit model to account for ambiguity in the same. Exact scope for ATMS may be specified in schedules.	Provisosn of the Concession Agreement and the proposed scope defined in the tenders for capacity augmentation maye be referred.
10	Rockfall/Landslide protection is not proposed in Schedule B. But it is needed in two Ghat sections (524+710 to 527+360 & 566+550 to 568+450) where existing carriageway already has 6-lane configuration and no service roads are proposed. So EPC contractor for 6-laning will not provide Gabion walls either. Will NHAI cover the construction cost (approx 6.07 Cr) for Gabion walls at two ghat sections?	Site shall be handed over to the Concessionaire on "as is where is" basis.  As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
11	New Structures added in EPC Contract Like VUP,PUP,New Major Bridge beside Existing Major Bridge. Please clarify whether maintenance during DLP period for Existing 4 Lane structures will be done by EPC Contractor or InvIT concessionaire.	

Sl.No	Description	Reply
12	Scope of Work regarding ATMS & Toll Plaza given in Schedule B of invit Concession Agreement & also given in EPC Tender Agreement . Kindly Clarify the Invit Concessionaire Scope of Work regarding Toll Plaza and ATMS.	
13	Details of 6 laning structure (post capacity augmentation) is not clarified	Above mentioned replies may be referred
14	In view of the above, kindly clarify about the maintenance of existing structures (Schedule A of invit concession agreemet) whether the same will be done by the EPC contractor during its 6 laning (including DLP period) or if they are to be considered by Concessionaire?	
15	It is understood that maintenance of Existing service road for Kagal Belgaun project during Capacity Augmentation & DLP will be done by EPC Contractor as per Annexure 1 of Schedule E of EPC Agreement. Please clarify.	
16	the Milestone for completion of capacity augmentation and revision in toll rates. Since no milestones are mentioned in the InvIT concession agreements (for augmentation), investors have sought clarity on whether it would be completion of 75% of the road length for issuance of PCOD or some other benchmark. further what would be the milestone relating to completion of structures at the time of PCOD.	Refer definition of Fee, Fee Rules and Fee Notification, defined in Article 41 and Article 27 and 28 of the Concession Agreement.
17	TOT toll policy should include the following provisions - (1) 1. NHAI need to make provision for compensation, if 6 laning is delayed by EPC. As additional toll as well basic toll both will be lost; (2) As per notification dated 16th January, 2014, fee about structures more than 60 m length is given  Capacity augmentation: What are the requirements (completion %, milestones achieved etc) to be met for the additional length to start getting tolled in the case that tolling length is being increased because of additional structures	



Annexure C- Chittorgarh Kota -Reply to Investor's Queries		
1	5 MMR cycles are considered as follows: Year Cost	Considering proposed Major Maintenance in year 2048-49, no major Maintenance has been considered in the financial assumptions at handing over in 2051.
	2024-2025 : 40.79	
	2030-2031 : 31.99	
	2036-2037 : 31.99	
	2042-2043 : 31.99	
	2048-2049 : 31.99	
2	No cost is considered at Handing over in 2051. Is it required to considered and if so what is the cost to be assumed?	
3	No MMR is considered for Rigid pavement of MCW. Only Routine maintenance of rigid pavement for entire length is considered.	Yes.
4	Interchange at starting point Km 892. There are two loops Bhilwara-Kota & Kota to Bhilwara at start point of the project. Scope for maintenance of same is not included in schedule B. Please confirm that maintenance of interchange loops is not under the project's scope	Project Highway is defined as Site comprising from km 891.929 to km 1052.429 of NH-27.
5	Interchange at starting point Km 896.7. There are four loops Between Project Road and Chittorgarh Indore Highway. Scope for maintenance of same is not included in schedule B. Please confirm that maintenance of interchange loops is not under the projects scope	All assets of Project Highway are under the scope of the Concessionaire.
6	Existing Service Road locations have sudden entry/exit into project highway. Some of the service roads have steep gradients as well. No scope is included for construction of entry/exit at existing SR locations. Please confirm the same.	As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
7	Earthen Shoulder width all along the project highway is 1m. Slope erosions have been noted at several places along the project. No chute drains/Kerb-Channel arrangement exists on ground does estimated capex include such items under scope? Please confirm the same	Site shall be handed over to the Concessionaire on "as is where is" basis.  As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
8	Safety items such as Safety barriers/Signs etc are not included as part of scope. Please confirm the requisite safety barriers/signs would be installed by authority before handing over	
9	Provision of Bus shelters are not considered at all Bus bay existing on ground. Only few locations shelters are considered. Please confirm the same	Bus Shelters shall be developed as per details provided in Schedule B.
10	Approach (Immediate approach) appears to be manually laid PQC and damaged at several underpasses and CD structures. Does the estimated capex include repairs to same? Please confirm	Expenditure against the repairs have been considered in the financial assumptions against Maintenance Cost.

11	There is provision of 4 VUP of 1x 12m span. Existing at-grade intersections mostly have channelizers and appears to have more length requirement for these proposed underpasses. (KM 908 end of Chittorgarh Bypass) Please confirm the same.	The Concessionaire is required to carry out detailed engineering and all other activities incidental to complete the obligations complying with Standards and Specifications as defined in the Concession Agreement.
12	Proposed Approach Cross section with RE wall for approaches at grade separators is not included in scope	Concessionaire has to build the grade separators including approaches with RE wall etc. all complete.
13	Length of approach at grade separators is not included in schedules.	The Concessionaire is required to carry out detailed engineering and all other activities incidental to complete the obligations defined in the Concession Agreement.
14	Is there any Plan & Profile developed for approaches of grade separators? May please provide the same. Actual length of approach should be based on Plan/Profile drawings	
15	Acad file of Lidar data may please be provided. Only PDF is available.	Again provided. Refer following Link <a href="https://drive.google.com/drive/folders/1w1fjpc5_haujZBsfdO69uKLR6BW/BWMn1?usp=sharing">https://drive.google.com/drive/folders/1w1fjpc5_haujZBsfdO69uKLR6BW/BWMn1?usp=sharing</a>
16	Proposed Pavement Crust thickness to be adopted for all the new approaches is not mentioned in scope. Only pavement crust for service road is included	Crust composition shall be same as Main Carriageway.
17	Service roads are suggested at VUP on both sides at Km 913.100 to 913.300. There is already existing Service Road at this location on LHS side. On RHS side there is temple which will get affected for construction of service roads. Please confirm the land availability at this location	Land availability is confirmed.
18	Service roads are suggested at VUP at Km 944.6. On LHS between 944.4-944.6. This require service road to be provided at a steep gradient. There are some houses on LHS side. Please confirm the land availability at this location	
19	Median opening at Km 971.600 is not properly done at site, There is a culvert adjacent to junction/median opening. This culvert require widening for proper design of junction/median opening. Please confirm the same.	The Concessionaire is required to carry out detailed engineering and all other activities incidental to complete the obligations defined in the Concession Agreement.
20	Service roads and new VUP are suggested at Km 993.250. SR are from 992.910-993.590 on both sides. There is a power substation at Km 992.910 on LHS side which may get affected as part of Entry/Exit. Please confirm the availability of Land at this location.	Land availability is confirmed.

21	<p>A new VUP is suggested at Km 1001+750, But Actual junction is at 1001+400. Is there any special consideration for shifting the VUP location away from junction? Please confirm the location of same. SR are suggested at this location between 1001.400 to 1002.200 on both sides. There is existing road on LHS side at this location. Please confirm the scope. Please provide plan &amp; Profile drawings for this VUP along with Service roads</p>	<p>Proposed location of VUP is km. 1001+400.</p> <p>Issue of existing service road (i.e. negative Change of Scope) shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.</p>
22	<p>Service roads are suggested between Km 1008.600 to 1010.400 on Both sides. On LHS side there is service road between 1008.1 till 1008.600 and length between 1008.6 to 1010.2 is fine. There already existing SR between 1010.2-1010.4 on LHS side. On RHS side there is no Service Road between 1008.100 to 1008.600. The RHS service road will have connection to X road. Please confirm the scope of Service roads at this location</p>	<p>Issue of existing service road (i.e. negative Change of Scope) shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.</p>
23	<p>Flexible pavement between Km 1010- Km 1024 appears in a poor condition. This section caters for heavy loading from adjoining stone quarries. Provision of 40mm BC at every 6 years may require a reconsideration in view of the same</p>	<p>As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.</p>
24	<p>Longitudinal joints have wide spacing (&gt;5cm) at some locations indicating requirements for stitching/stapling. Does the estimated capex include such repairs? Please confirm</p>	<p>Expenditure against the repairs have been considered in the financial assumptions against Maintenance Cost.</p>
25	<p>Guard stones are used in place of safety barriers at approaches to CD structures, which require replacement with safety barriers as per new guidelines. Please confirm the same. Most part of the road is on the high embankment and may meet the norm to provide for safety barriers. Appears not fully provided for. Please clarify</p>	<p>As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.</p>
26	<p>For additional toll lanes to be constructed whether sufficient land is available.</p> <p>In TP2, there is no Toll Plaza building available. Whether this is provided in Capex to be checked</p>	<p>Yes.</p> <p>Yes.</p>

27	Construction of a Toll Building at Aroli toll plaza is not proposed in Schedule B even though Schedule A mentions that Toll Building is absent here. A Toll Building is needed here to accommodate the InvIT Concessionaire's staff for running the toll operations and doing maintenance. Will NHAI provide land for constructing the Toll Building at Aroli toll plaza and will NHAI cover the cost of construction?	NHAI will provide land for construction of Toll Building.  NHAI will not cover the cost of construction of toll plaza.
28	FWD analysis in Technical report for CK shows that structural overlay is required in 28 km Flexible Pavement. Please confirm whether structural overlay will be provided by NHAI prior to handing over to InvIT concessionaire.	Site shall be handed over to the Concessionaire on "as is where is" basis.  As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.
29	Existing Flexible Pavement of 28 km has alligator cracking in almost entire length. Will repair for cracking be done by NHAI before handing over to InvIT concessionaire?	
30	Details of 6 laning structure (post capacity augmentation) is not clarified	Capacity Augmentation shall be carried out as per provisions of the Article 14.

Annexure D: Palanpur-Abu Road		
Replies to Investors queries		
Sr. No.	Query	Reply
1	3 MMR cycles are considered as follows:  Year	



Sr. No.	Query	Reply
12	Additional lanes are required to be added at Both Toll Plaza. Do they have sufficient land for the same? Please confirm. Is it required to consider staggered toll lanes in case there is no land? Please confirm.	Additional Toll lanes, if required, shall be developed within available RoW.
13	At KM 606.100 VUP location about 300 to 400 No's of trucks per day diverting towards Deesha and Kandla port and there is an existing BT road to skip the Khemana toll plaza. Is there any possibility to avoid leakage? Please confirm.	Site shall be handed over to the Concessionaire on "as is where is" basis. SH-54 is crossing at 606.100.
14	New SR is suggested for 50m between Km 606.400 to 606.450 on LHS side. There is existing SR at this location. Please confirm.	Already existing service road is there. Issue of existing service road (i.e. negative Change of Scope) shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.
15	A junction improvement is suggested at Km 635+350 on RHS side. There is existing SR at this location. Junction improvement to be done with SR? please confirm.	Junction shall be developed in consultation with the Authority.
16	New SR are suggested between KM 636.900 to 637.500 on both sides. Existing SR on both sides end at Km 636.5. There will be small gap of less than 150m between old and new after entry/exit ramps constructed. Please confirm.	Service roads shall be developed as per provisions of Concession Agreement.
17	As per Schedule-A of Invit Concession Agreement, Clause 10. "Toll Plaza Number of Tolling Lanes given as (4+4) with Weigh in Motion Facility in 4+4 lane & Static Weigh Bridge 1 No on RHS Side. As as per site investigation, neither Weigh in Motion nor Static Weigh Bridge is present on site . Will NHAI cover the additional cost of Rs.1.02 Cr for providing WIM in existing lanes & Static Weigh bridge?	No
18	Details of 6 laning structure (post capacity augmentation) is not clarified	Capacity Augmmentation shall be carried out as per provisions of the Article 14.

Annexure E:Abu Road-Swaroopganj			
Replies to Investors queries			
Sr. No.	Query	Reply	
1	3 MMR cycles are considered as follows:	Considering the DLP of 5 years after capacity augmentation, no cost has been considered in the financial assumptions.	
	Year		Cost
	2029-2030		29.51
	2035-2036		29.51
	2041-2042	32.34	
2	No cost is considered at Handing over in 2051 assuming that it will be under DLP of 5 years after capacity augmentation in 2044-46		
3	In case the capacity augmentation is delayed by 2-3 years, the impact of same may need to be addressed.	Capacity Augmmentation shall be carried out as per provisions of the Article 14.  Impact assessment is required to be carried out by the Bidders/ Invetors on their own.	
4	What is the impact of tolling after 6 laning as the project has major bridges to be constructed? (Tollable length will get increased depending on Bridge>60m length)	As per Clause 14.1.4 of the Concession Agreement, "the Concessionaire shall be entitled to collect and appropriate the additional revenues from the augmented stretch."	
5	During the DLP period, would the MM costs and R&M costs for the entire project be carried out by the EPC contractor at its own cost?	Yes.	
6	New SR are suggested at Km 647.040 tp Km 647.700 on LHS near School. There are couple of houses getting affected for construction of same. Please confirm the availability of ROW for the same.	ROW is available	
7	Junction improvement is suggested at Km 650.900. There is SR on RHS side at this location. Please confirm junction improvement with SR. There is a bus stand on LHS side immediately before junction. May require shifting. Please confirm.	Junction improvement shall be carried out as per provisions of the Concession Agreement.  As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.	
8	Junction opening suggested at Km 652+800 just after a Major bridge with median opening. This will be a safety hazard. It may be required to consider closing median opening are shifting of same by providing Service Roads. Please confirm.		
9	New SR is suggested between Km 659.7-660.800 on RHS side near Madhav University College. There is a CC road parallel to project road on RHS side. Please confirm the SR at same location.	Issue of existing service road (i.e. negative Change of Scope) shall be dealt as per Article 21 (Change of Scope) of the Concession Agreement.	
10	Junction improvement is suggested at 662.800. There is an existing median opening and opposite road in staggered manner with a bus stop exactly at median opening. This junction improvement may require shifting of bus stop/provision of service road for a short length. Please confirm.	As per Clause 15.1.1 of the Concession Agreement, during Concession Period, the Concessionaire shall operate and maintain the Project Highway in accordance with the provisions of the Agreement and if required, modify, repair or otherwise make improvements to the Project Highway to comply with the provisions of this Agreement.	

Sr. No.	Query	Reply
11	New Junction is suggested at Km 668.800 on BHS. There is no Road at this location. Is this junction proposed for new road with RIICO Industrial area on RHS. Please confirm.	Junction improvement shall be carried out as per provisions of the Concession Agreement.
12	At Undavariya Toll plaza LHS 8.5m Land available between Pavement edge and ROW, RHS land not available due to Toll Admin building to develop 6+6 toll lanes, Please confirm the land availability for toll plaza development.	9 m of land is available on LHS from pavement edge to ROW. No land is available on RHS.
13	New Service roads are suggested at 676.4-677 on both sides. There is a bus bay on LHS side and a deep drain on RHS side at this location which may require relocation. Please confirm the same. Entry/Exit ramps for this service road location may go beyond project End point at Km 677. Please confirm the same.	The Concessionaire is required to carry out detailed engineering and all other activities incidental to complete the obligations complying with the Specifications and Standards defined in the Concession Agreement.
14	As per Schedule-A of Invit Concession Agreement, Clause 10. "Toll Plaza Number of Tolling Lanes given as (4+4) with Weigh in Motion Facility in 4+4 lane & Static Weigh Bridge 2 Nos. As as per site investigation, neither Weigh in Motion nor Static Weigh Bridge is present on site . Will NHAI cover the additional cost of Rs.1.02 Cr for providing WIM in existing lanes & Static Weighbridge?	No
15	Rockfall/Landslide protection is not proposed in Schedule B, instead it proposed W-Beam crash barrier at rockfall prone locations. As per site investigation, new Gabion is needed at one location (km 652.600 RHS) while height of existing Gabion wall needs to be raised at next location (km 648.800-649.200 RHS). Will NHAI cover the construction cost (approx 4.5 Cr) for Gabion walls at two locations?	No
16	Details of 6 laning structure (post capacity augmentation) is not clarified	Capacity Augmentation shall be carried out as per provisions of the Article 14.