

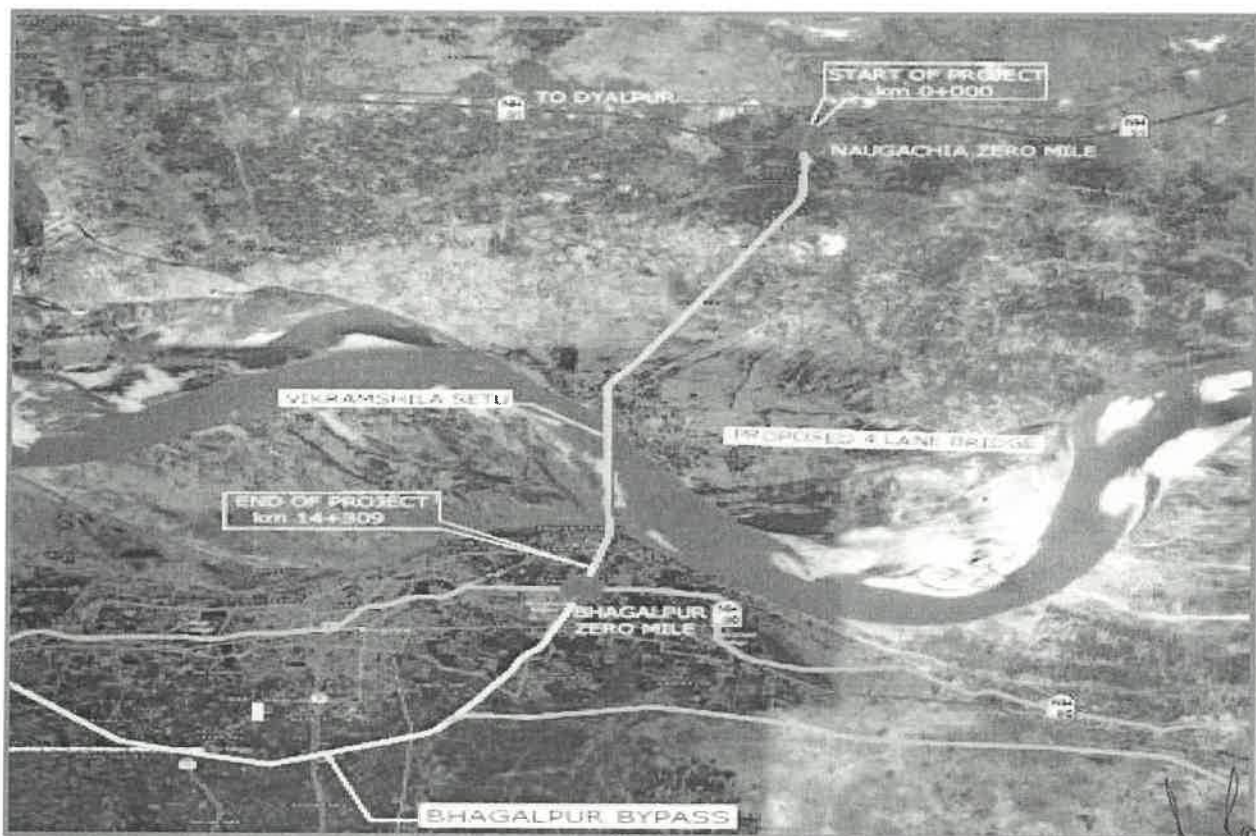


Bihar Rajya Pul Nirman Nigam Limited

7, Sardar Patel Marg, Patna

UNDER WORKS DIVISION, BHAGALPUR

**Consultancy Services for preparation of Detailed Project Report
(for EPC Mode) for the construction of new 4-lane Bridge with
approaches parallel to existing Vikramshila Setu in the District
of Bhagalpur in the state of Bihar**



Executive Summary

*Senior Project Engineer
Works Division Bhagalpur
Bihar Rajya Pul Nirman Nigam*

Consultant: -

RODIC CONSULTANTS PVT. LTD

IN JV WITH

**MONARCH SURVEYORS & ENGINEERING
CONSULTANTS PVT. LTD.**




**TABLE OF CONTENTS**

0.0	EXECUTIVE SUMMARY.....	4
0.1	Introduction.....	4
0.2	Project Overview	4
0.3	Project Description	6
0.3.1	Existing Road Features.....	8
0.4	Traffic Survey Analysis and Forecast.....	8
0.4.3	Axle Load Survey	10
0.4.4	Speed-Delay Survey	10
0.4.5	Growth Rate	11
0.5	Improvement Proposals	11
0.5.1	Widening Scheme	11
0.5.2	Traffic Control and Safety Measures	26
0.5.2.1	Road Marking & Traffic Signs	26
0.5.2.2	Proposal for Truck Lay byes/Parking cum Rest Area	26
0.5.2.3	Project Lightening.....	26
0.5.2.3	Bridge Health Monitoring System	27
0.5.2.4	Service Road.....	27
0.5.2.4	Crash Barrier.....	28
0.5.3	Pavement Design	28
0.5.4	Major Bridge	29
0.5.5	Culverts	30
0.5.6	Drainage Works	30
0.5.7	Protection work	31
0.6	Environmental Impact Assessment.....	31
0.6.1	Social screening.....	32
0.7	Land acquisition Requirement.....	33
0.8	Material investigation.....	33



Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

0.8.1	Borrow pits for soil.....	33
0.8.2	Sand	33
0.8.3	Gravel.....	33
0.8.4	Bitumen.....	33
0.8.5	Cement.....	33
0.8.6	Steel	34
0.8.7	Bearings	34
0.8.8	Expansion joint.....	34
0.8.9	Prestressing System	34
0.9	Conclusion and Recommendations	34


Senior Project Engineer
Works Division, Bhagalpur
Bihar Road Transport Corporation Ltd.

**LIST OF TABLES**

Table 1: Key features of project road.....	5
Table 2: Summary of Classified Volume Count Survey at all count stations.....	9
Table 3: Summary of Average Daily Traffic (ADT)	9
Table 4: Summary of Annual Average Daily Traffic (AADT).....	9
Table 5: Summary of Projected Total AADT Traffic PCU Volume / day	10
Table 6: Adopted VDF	10
Table 7: Summary of Speed-Delay Survey	11
Table 8: Comparative Analysis and Adopted of Growth Rates	11
Table 9: Summary of widening scheme as per TCS.....	12
Table 10: Improvement Proposal for New Pavement (Main Road).....	28
Table 11: Footpath cum RCC Cover Drain.....	30
Table 12: Toe Wall/ Retaining Wall	31


Senior Project Engineer
Works



0.0 EXECUTIVE SUMMARY

0.1 Introduction

The Bihar Rajya Pul Nirman Nigam Limited (BRPNNL) has been entrusted with the assignment of Project Management Consultancy Phase I including preparation of Detailed Project Report of selected stretches/corridors for four laning with paved shoulder configuration.

In pursuance of the above, **Rodic Consultants Pvt. Ltd. In JV with Monarch Surveyors & Engineering Consultants Pvt. Ltd.**, in the state of New Delhi have been appointed as Consultants to carry out the Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar. As per Gazette notifications number S.O. 694-95 (E), dated 05.02.2019, the project road has been declared as **National Highway 131-B**.

The Consultants has proposed 2 options for the alignment from which the proposed alignment no.-2 having length approx. 14.309 km for new NH 131B starting from its junction with NH-31 near Naugachia and terminating at its junction with NH-33 (Old NH 80) is considered and approved via Ministry's letter no. 12014/58/2018/BR/Z-1 dated 25.11.2019.

The project has been divided into two packages which are as follows:

- Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309 (including approach road 874m on Naugachia side & 987m on Bhagalpur side)
- Package-II: Approaches of Major Bridge on Naugachia Side - CH. 0+000 to CH. 8+080.

The Agreement was signed on the 11th day of the month of September 2017.

0.2 Project Overview

The project road lies in Bhagalpur District of Bihar. And connects NH-31 to NH-80. The existing length of stretch is 14.950 Km. Location of project road is shown in the **fig. 0.1 below:**

*Senior Project Engineer
Works Division Bhagalpur
Bihar Rajya Pul Nirman Nigam*



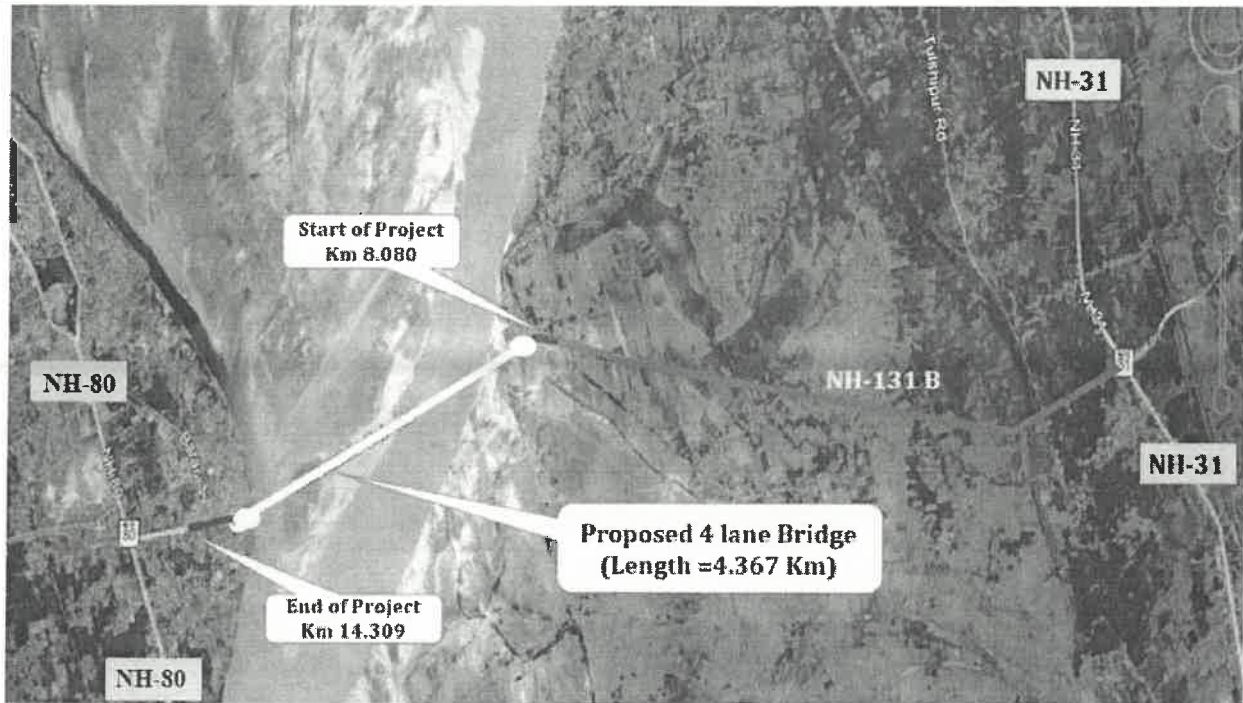


Figure 0.1: Location of Project road

2.1 Key Features of project

Key features of project road are represented in **Table 1**.

Table 1: Key features of project road

Attributes	Details
NH No.	NH 131B
Origin – Destination	Naugachia 25°22'41.60" N and 87°03'47.70" E Bhagalpur 25°15'12.26" N and 87°01'21.13" E
Via Town	Naugachia, Bhagalpur
Existing Carriageway	2 Lane
Proposed Carriageway	4 Lane (as per IRC 84:2019)
Service road	Package I – 2.629 Km Package II – 6.892 Km
Shoulder	Paved
Condition of Existing Pavement	Fair to Good
Right of Way	60 m
Land Use along project road	Agricultural & Built-up
Traffic on the stretch	AADT – 16251 PCU
Structures along the stretches	Package I Major Bridge – 1 No (Length 4367.2 m) VUP - 2 Nos. (21 x 5.5m- New); 1 no. widening Package II Box Culvert – 10 Nos LVUP - 2 Nos. (12 x 4.0 m)- New Construction

Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.

Senior Project Engineer
Works Division Bhagalpur
Bihar Rajya Pul Nirman Nigam



Attributes	Details
Junctions Improvement	Package I Minor Junction-2nos. Package II Major- 1 No. Minor- 5 Nos.
Toll Plaza	1 No. (Package-II)
Terrain	Plain
Forest stretches along RoW	Nil
Rail Crossing along RoW	Nil
Other clearance related aspects	IWAI

0.3 Project Description

The entire proposed project road is in the state of Bihar. It is an Indian state considered to be a part of Eastern as well as Northern India. It is the 13th-largest state of India, with an area of 94,163 km² (36,357 sq. mi). The third-largest state of India by population, it is contiguous with Uttar Pradesh to its west, Nepal to the north, the northern part of West Bengal to the east, with Jharkhand to the south. The Bihar plain is split by the river Ganges which flows from west to east. Bihar is an amalgamation of three main distinct regions, these are Magadh, Mithila and Bhojpur. The project road start from 25°22'41.60" N and 87°03'47.70" E and ends at 25°15'12.26" N and 87°01'21.13" E in the state of Bihar, district Bhagalpur. The project stretch i.e. Naugachia Zero Mile to Bhagalpur Zero Mile Section, is connected NH-31 to NH-80 in Bihar. The length of the stretch is about 14.950 km. There is existing Vikramshila Setu Bridge which is a two-lane Bridge of 4.367 km length between Km 8.983 to Km 3.350 with approaches on Bhagalpur side 1.60 km length and Naugachia side 8.9 km. The proposal is for a new bridge adjacent to the existing Vikramshila Setu.

The project has been divided into two packages which are as follows:

- Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309 (including approach road of 874m on Naugachia side & 987m on Bhagalpur side)
- Package-II: Approaches of Major Bridge on Naugachia Side – CH. 0+000 to CH. 8+080.

Signature
Works
Bihar Rajya Pul Nirman Nigam Ltd.





FINAL DPR BHAGALPUR

EXECUTIVE SUMMARY

Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

Project Key Map



Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.

Senior Project Engineer
Works Division Bhagalpur
for Major Road NH 80 Bypass





0.3.1 Existing Road Features

The entire length of project road has a carriageway width of 10.0 m.

The project road traverses through plain terrain.

0.3.2 Existing condition of project road

The major portions of the project road are in fair to good condition.

0.3.3 Existing Road Junctions

There are number of earthen, gravel and bituminous roads meeting/crossing the project highway. The project road has 1 Major junctions and about 10 minor junction in the project stretch. The intersection details are given in Chapter 4 of this report.

0.3.4 Existing Bridge & Cross Drainage Structures

There are about 01 nos. major bridges, there is no minor bridges, and 2 nos. Culverts existing on the project road. Existing structures details are described in the engineering survey & investigation chapter (Chapter 4) and their improvement proposals are given in Chapter 8 of this report. In addition to cross drainage structure there is one Underpass.

0.4 Traffic Survey Analysis and Forecast

It is very important, that the existing information on traffic flow, commodity movement and traffic pattern is required to assess the traffic behaviour on a project road. To collect such information to satisfy the Terms of Reference (TOR) and project requirements, following various types of traffic surveys were carried out:

- Classified Traffic Volume Count Survey
- Intersection Volume Count Survey
- Axle Load Spectrum Survey
- Origin – Destination (OD) Survey and commodity movement Surveys
- Speed and Delay Survey
- Truck Terminal Survey



0.4.1 Classified Volume Count Survey

A comprehensive traffic survey plan has been prepared for the project road after considering traffic intensity on homogeneous sections and travel characteristics. Detailed site visit of project road and its influence/alternative transport network has been carried out between on 5th Oct to 12th Oct 2017. Traffic survey locations were finalised by consultation with client officials.

Table 2: Summary of Classified Volume Count Survey at all count stations

Sr. No.	Chainage	Homogeneous Section	Justification for selecting the location
1	3+450	Start of Project to End of Project	Km 3+450 has been selected to get the idea of traffic in homogeneous section from Start of Project (Km 0+000) to End of Project (Km 14+950)

ADT (Average Daily Traffic)

The Average Daily Traffic (ADT) for all traffic survey locations is presented vide Table below and detail analysis is provided in Ch. 3 of main report.

Table 3: Summary of Average Daily Traffic (ADT)

Sr. No.	Location	Total ADT (No.)	Total ADT (PCU)	Fast Moving Vehicles (PCU)	Slow Moving Vehicles (PCU)
1	Khagra Km (3/450)	10888	16817	16700	117

AADT (Annual Average Daily Traffic)

The seasonal correction factors are used to convert Average Daily Traffic (ADT) to Annual Average Daily Traffic (AADT). The Annual Average Daily Traffic for all traffic survey locations is presented vide Table below and detail analysis is provided in Ch. 3 of main report.

Table 4: Summary of Annual Average Daily Traffic (AADT)

Sr. No.	Location	Total AADT (Nos.)	Total AADT (PCU)	Fast Moving Vehicles (PCU)	Slow Moving Vehicles (PCU)
1	Khagra Km (3/450)	10418	16251	16135	117



Projected Traffic

Projected traffic means a forecast of the number of vehicles in respect of Year during the Determination Period.

Table 5: Summary of Projected Total AADT Traffic PCU Volume / day

Homogeneous Section	Year 2019	Year 2022	Year 2024	Year 2038	Year 2043
Naugachia to Bhagalpur (Ex. Km 00+000 to Ex. Km 14+950)	17917	20148	20962	27659	30538

0.4.2 Turning Movement Count

TMC survey has not been conducted at any location.

0.4.3 Axle Load Survey

To estimate vehicle loading spectrum on the project road, and to determine vehicle damage factor for the commercial vehicles, the axle load surveys have been carried out at identified location. The survey is analysed to obtain Vehicle Damage Factor (VDF) and is presented below:

Table 6: Adopted VDF

SUMMARY			
Vehicle Type	Bhagalpur to Naugacchia	Naugacchia to Bhagalpur	VDF
LCV	1.736	1.127	1.736
2 Axle Truck	3.656	2.902	3.656
3 Axle Truck	7.265	7.992	7.992
Multi Axle Truck	9.202	11.396	11.396
Bus	0.675	0.679	0.679

0.4.4 Speed-Delay Survey

Round trip was made on entire project road during identified peak period using new technology vehicle. The survey vehicle was kept maintaining the speed of existing traffic flow. Start time, delay occurred, distance covered, and end time were recorded on the specified survey format. The data thus obtained is analysed and presented below:



Table 7: Summary of Speed-Delay Survey

Sr. No.	Section		Distance (Km)	Average travel Time during off-peak (minutes)	Average speed during off-peak (km/hr)	Travel Time during peak (minutes)	Average speed during peak hours (km/hr)	Delay (minutes)	Reason for delay
	From	To							
1	Naugachia	Bhagalpur	14.950	20	45	35	25	20	Delay mainly due to the congestion on project road

0.4.5 Growth Rate

The various methods specified vide IRC 108: 2015 are taken into consideration for arriving at reasonable growth rate for traffic in future. The results of such methods along with proposed growth rate for each type of vehicle are presented vide Table below and detail analysis is provided in Chapter 5 of main report:

Table 8: Comparative Analysis and Adopted of Growth Rates

Sr. No.	Vehicle Type	Goods (%)	Bus (%)	Car (%)	3-Wheeler (%)	2-Wheeler (%)
1	Vehicle Growth Criteria Method	21.22	5.90	11.82	15.30	13.85
2	Net State Domestic Method	22.28	8.60	8.73	8.43	8.53
3	As per IRC	5	5	5	5	5
4	Adopted Growth Rates (Year 2017-2021)	5	5	5	5	5
5	Adopted Growth Rates (Year 2022 & above)	2	2	2	2	2

0.5 Improvement Proposals

The improvement proposals for the existing road is proposed for reconstruction from 2-lane to 4 lane carriageway as per IRC-SP:-84-2019.

0.5.1 Widening Scheme

Basis traffic information available, level of service requirements and in consultation with BRPNL & MoRT&H the following lane configuration is adopted for the project road. Proposed new 4-lane Bridge cross section and typical cross section have been adopted in approach based on IRC: SP: 84-2019. Minor modification has been done in the typical cross section due to site requirement. A summarized widening scheme is as under:



Table 9: Summary of widening scheme as per TCS

Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309

Sr. No.	Design Chainage		Length (m)	TCS-Details	TCS-Type
	From	To			
1	08+080	08+610	529.5	VUP Approach with toe wall both side	TCS-3
2	08+610	08+631	21	VUP	VUP
3	08+631	08+640	9.5	VUP Approach with toe wall both side	TCS-3
4	08+640	08+920	280	VUP/LVUP Approach with Right Side Service Road	TCS-3A
5	08+920	08+955	34.8	4 Lane Bridge Approaches With Retaining/ toe wall on Left Side	TCS 1A
6	08+955	13+322	4367.2	MAJOR BRIDGE	Major Bridge
7	13+322	13+375	53	4 Lane Bridge Approaches With Retaining/ toe wall on Right Side	TCS 1B
8	13+375	13+510	135	Bridge Approaches with Service Roads & Retaining wall on Right side	TCS-4
9	13+510	13+746	236.25	VUP Approach with right side service road & retaining wall	TCS-3B
10	13+746	13+752	5.5	VUP	VUP
11	13+752	13+960	208.25	VUP Approach with toe wall both side	TCS-3
12	13+960	14+309	349	4 lane divided highway with Right side Service Roads & Raised median	TCS-2B
Total Length in m			-19		

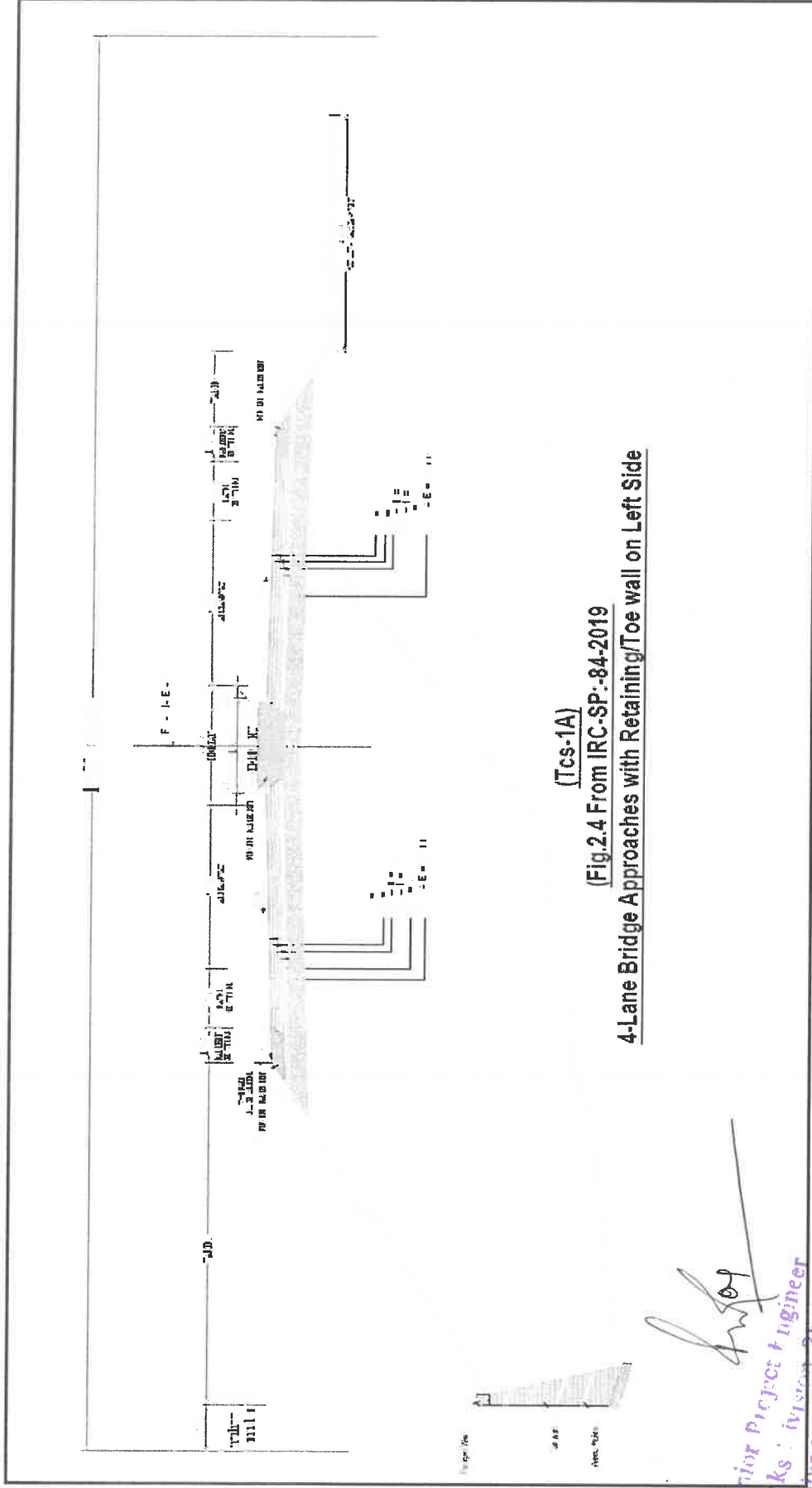
Package-II: Approaches of Major Bridge on Both Sides – CH. 0+000 to CH. 8+080

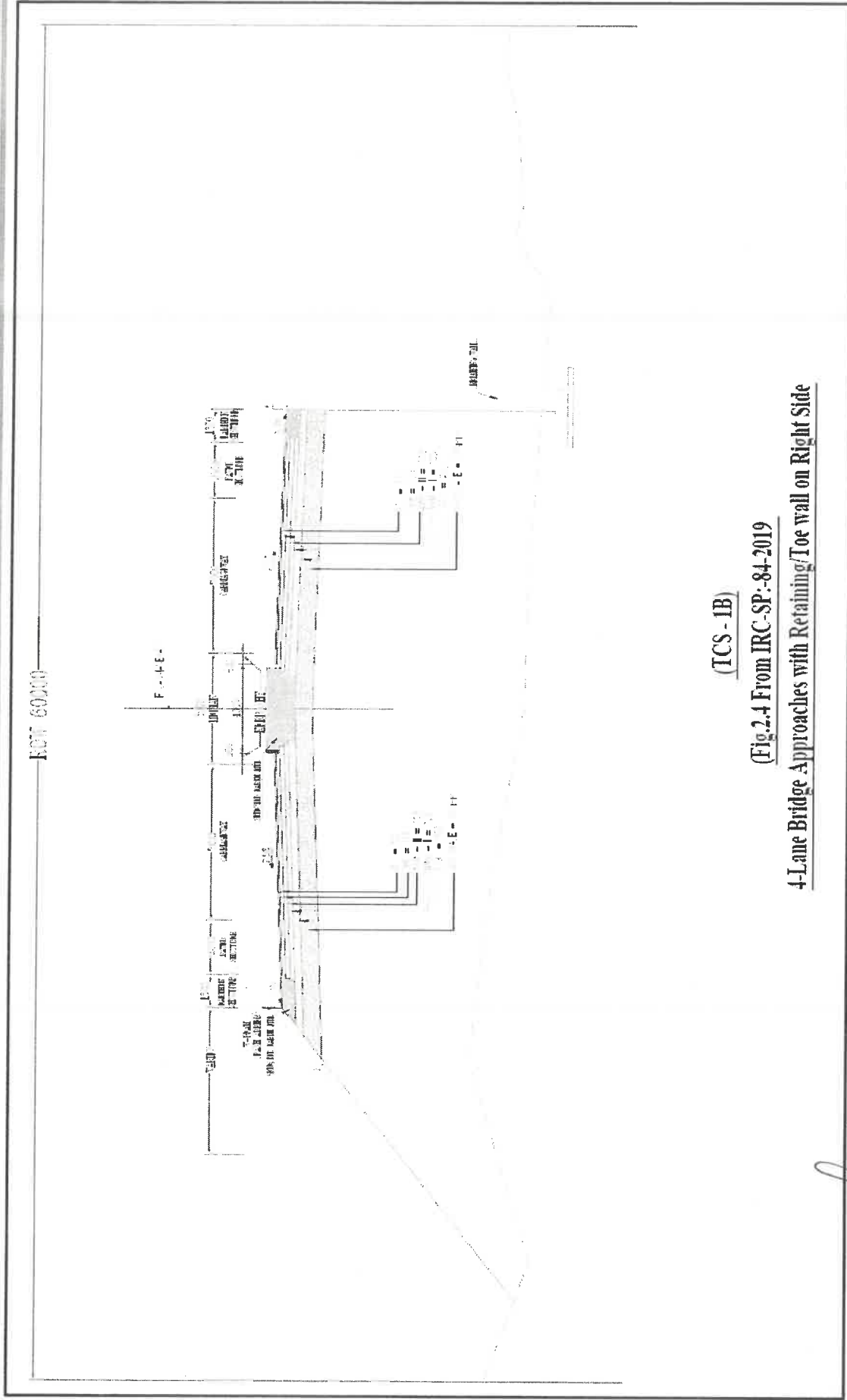
Sr. No.	Design Chainage		Length (m)	TCS-Details	TCS-Type
	From	To			
1	00+000	00+840	840	4-Lane with 5m Median	TCS-1
2	00+840	01+273	433	LVUP Approach with toe wall both side	TCS-3
3	01+273	01+285	12	LVUP	LVUP
4	01+285	01+670	385	LVUP Approach with toe wall both side	TCS-3
5	01+670	02+120	450	4-Lane with 5m Median	TCS-1
6	02+120	02+680	560	Toll Plaza	Toll Plaza
7	02+680	03+600	920	4-Lane with 5m Median	TCS-1
8	03+600	05+150	1550	4-Lane Urban with SR on Both side	TCS-2
9	05+150	05+613	463	LVUP Approach with toe wall both side	TCS-3
10	05+613	05+625	12	LVUP	LVUP
11	05+625	06+000	375	LVUP Approach with toe wall both side	TCS-3
12	06+000	07+600	1600	4-Lane with 5m Median	TCS-1
13	07+600	08+080	480	4-Lane Urban with SR on Left side	TCS-2A
Total Length in m			8080		



Typical Cross Section

Package-I and Package-II





(TCS - IB)

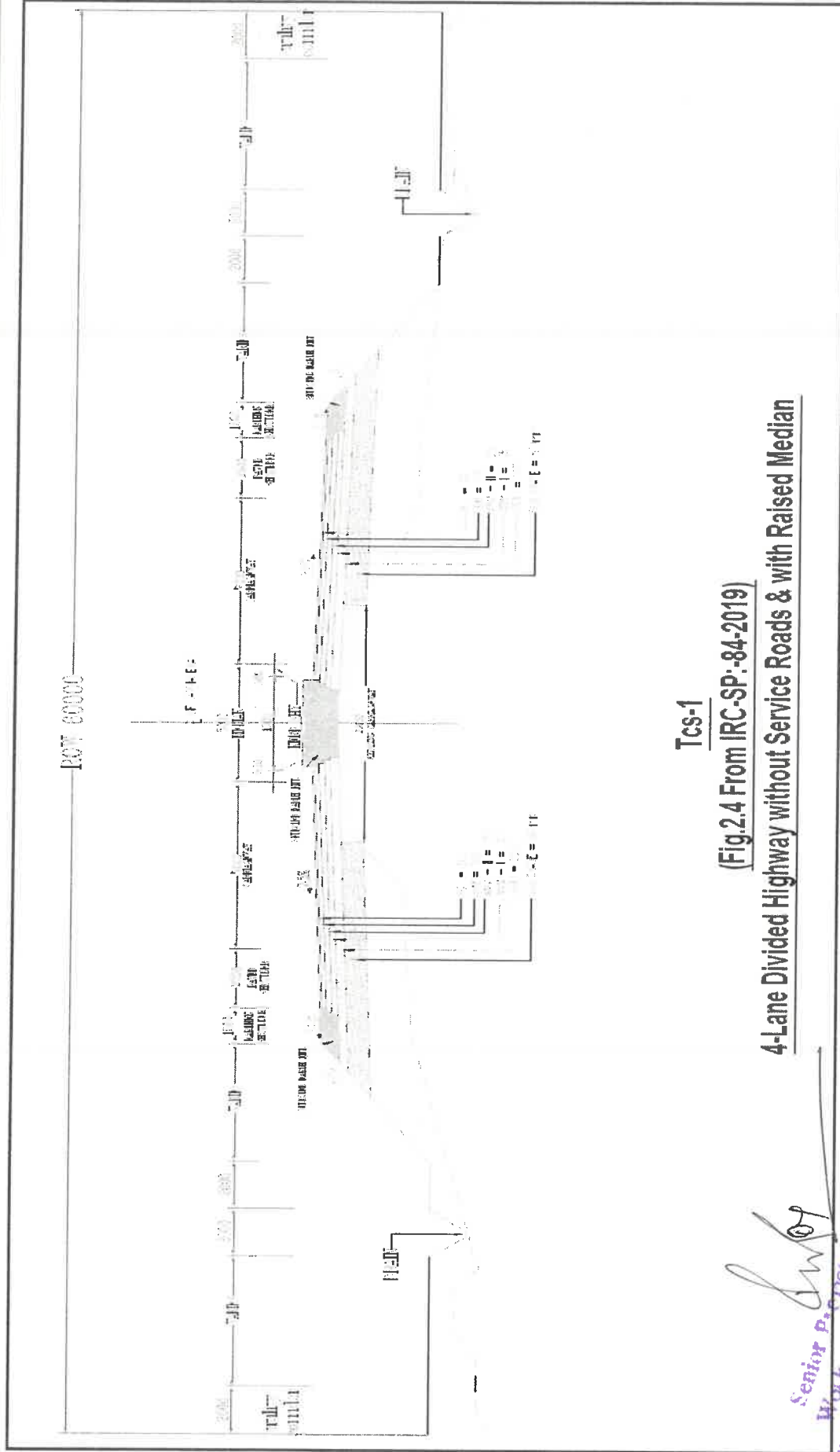
(Fig.2.4 From IRC-SP-84-2019)

4-Lane Bridge Approaches with Retaining/Toe wall on Right Side

Signature
Senior Project Engineer
Works Division Bhagalpur
Bihar Rajya Pul Nirman Nigam Ltd

Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.





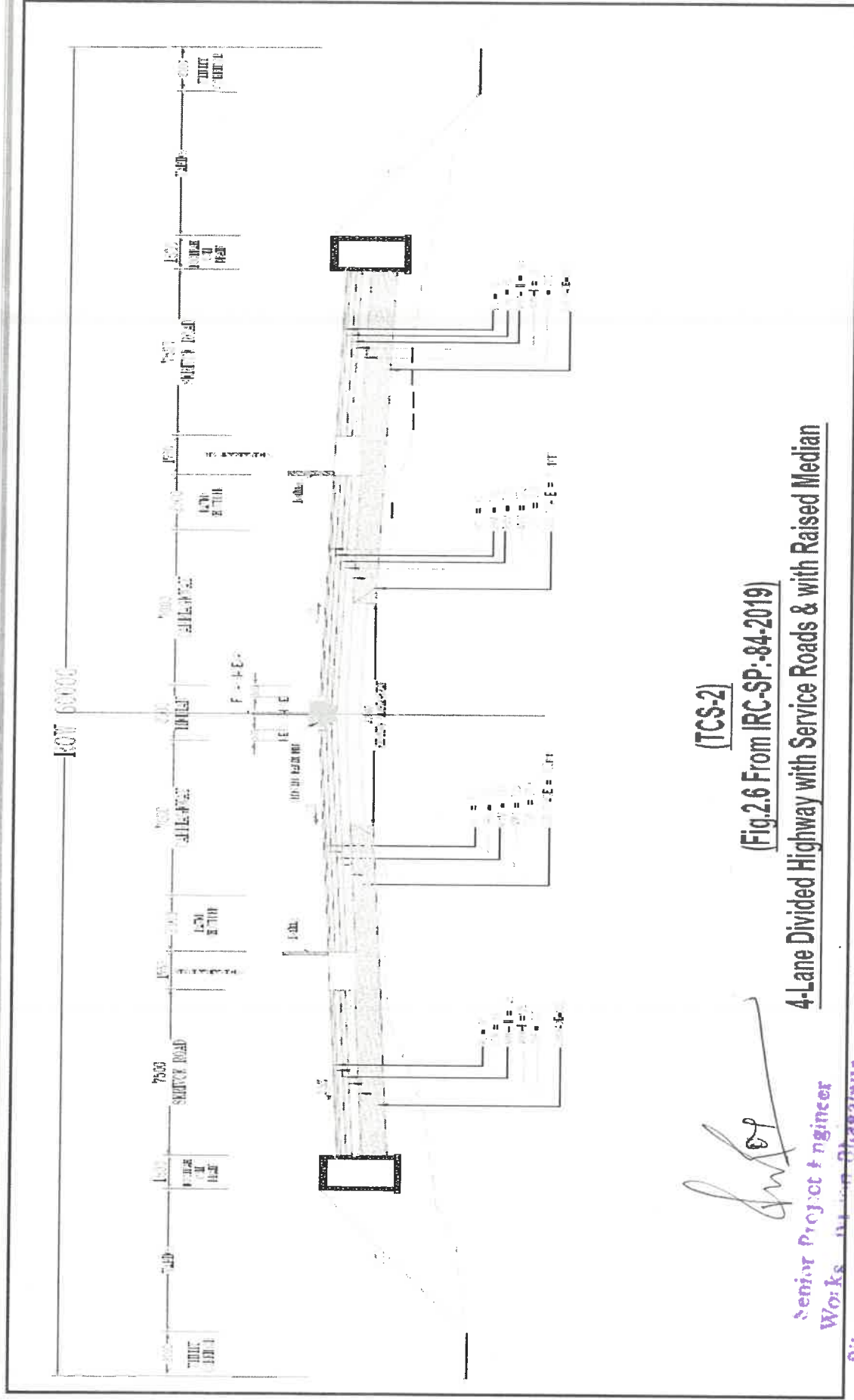
Tcs-1

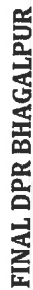
(Fig.2.4 From IRC-SP:-84-2019)

4-Lane Divided Highway without Service Roads & with Raised Median

Senior Project Engineer
Works Division Bhagalpur
Mr. Rajendra Kumar Nigam

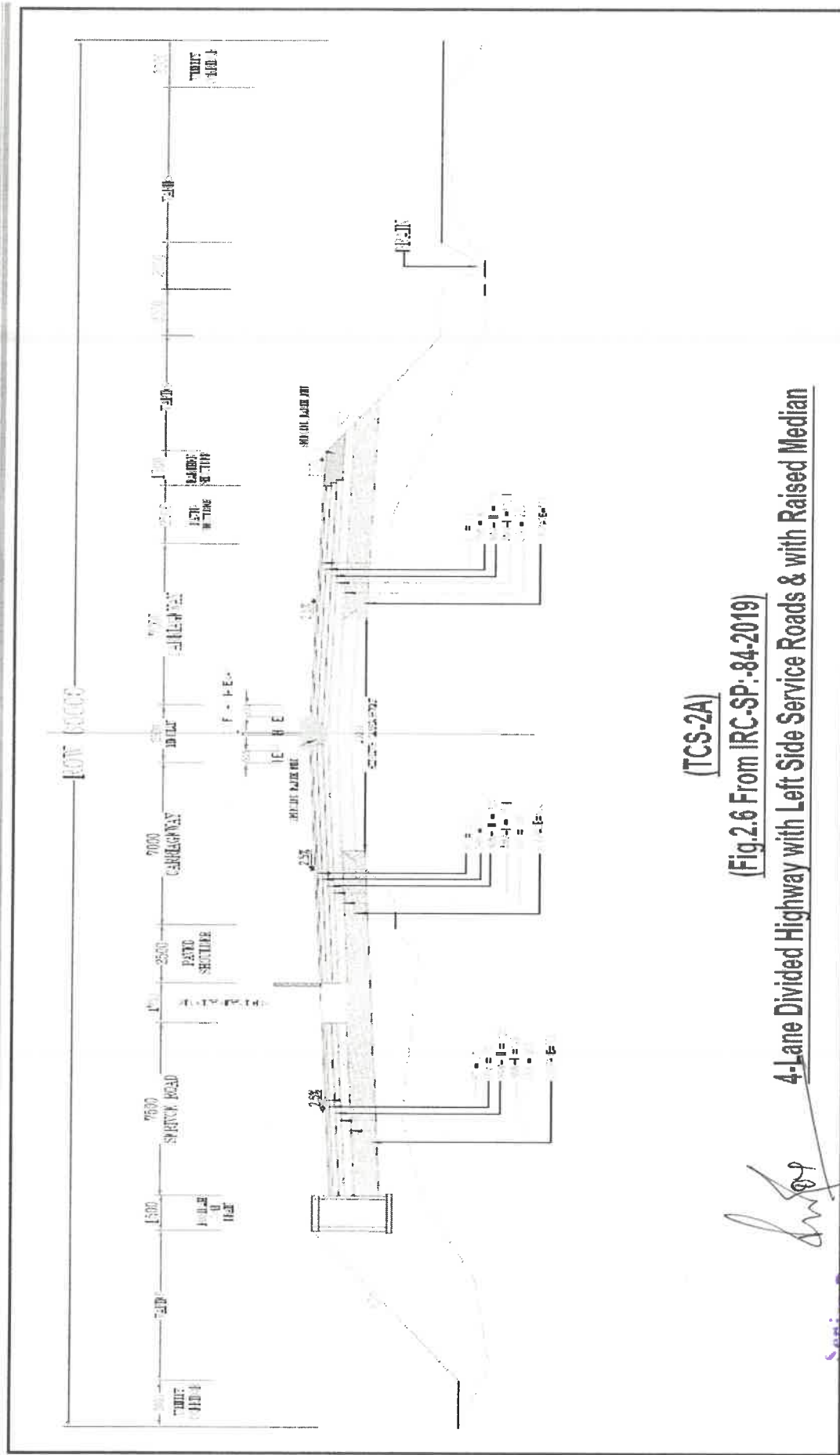




**FINAL DPR BHAGALPUR**

Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

EXECUTIVE SUMMARY



Senior Project Engineer
Works Division Bhagalpur
Dist. Rajaul Nigam Nigam Ltd

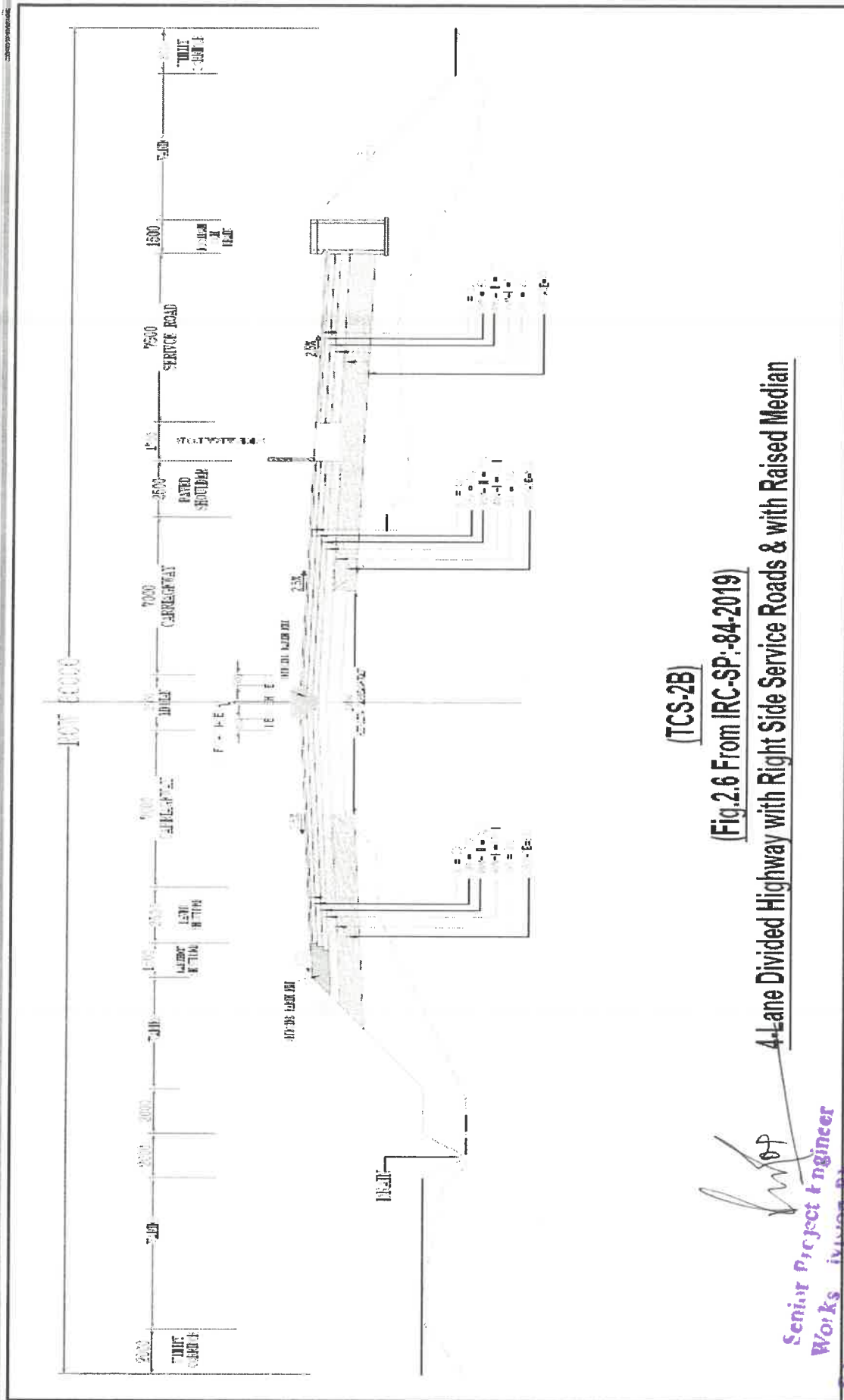
Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.



FINAL DPR BHAGALPUR

Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

EXECUTIVE SUMMARY

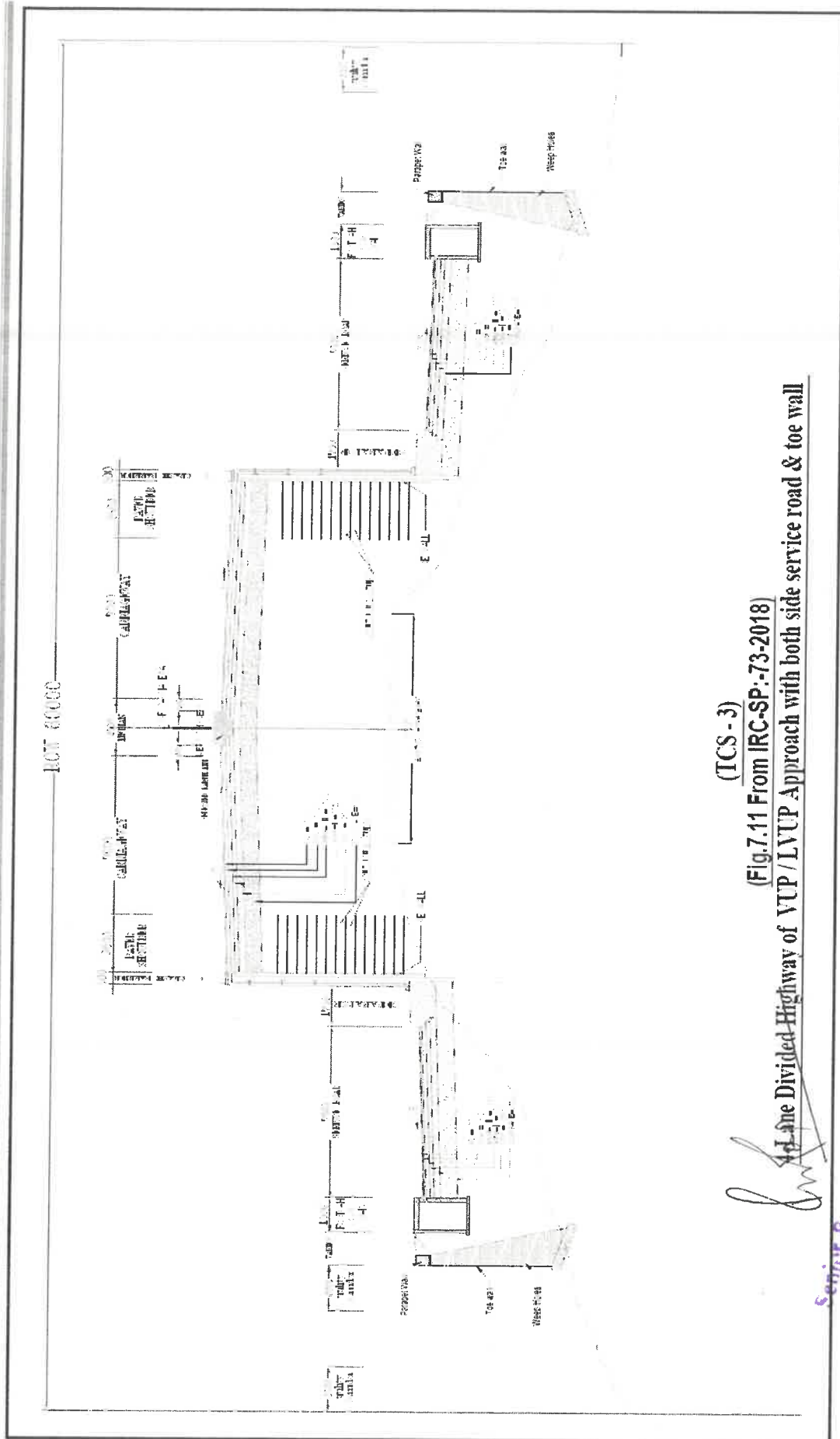


Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.



EXECUTIVE SUMMARY

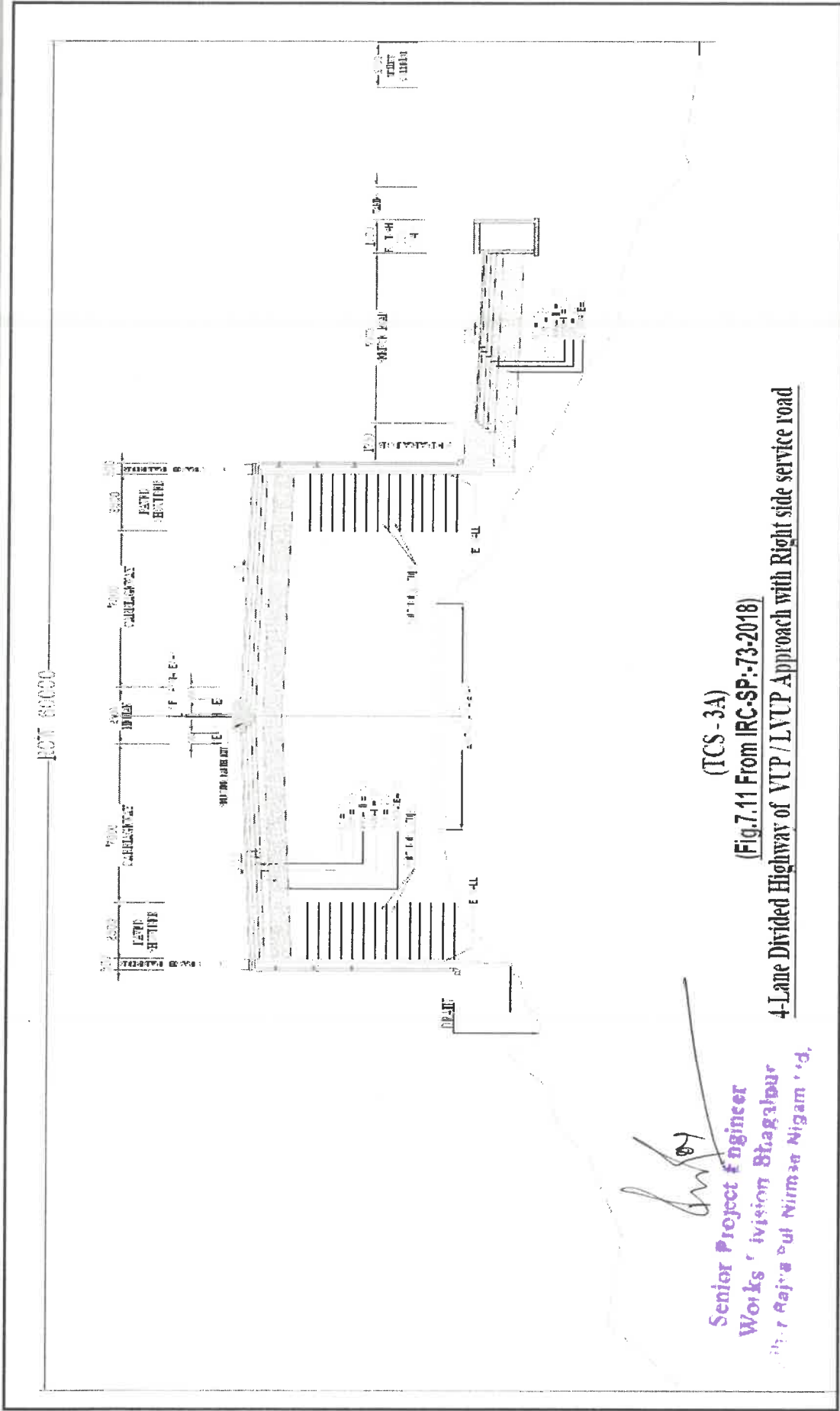
Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshilla Setu in the district of Bhagalpur in Bihar.

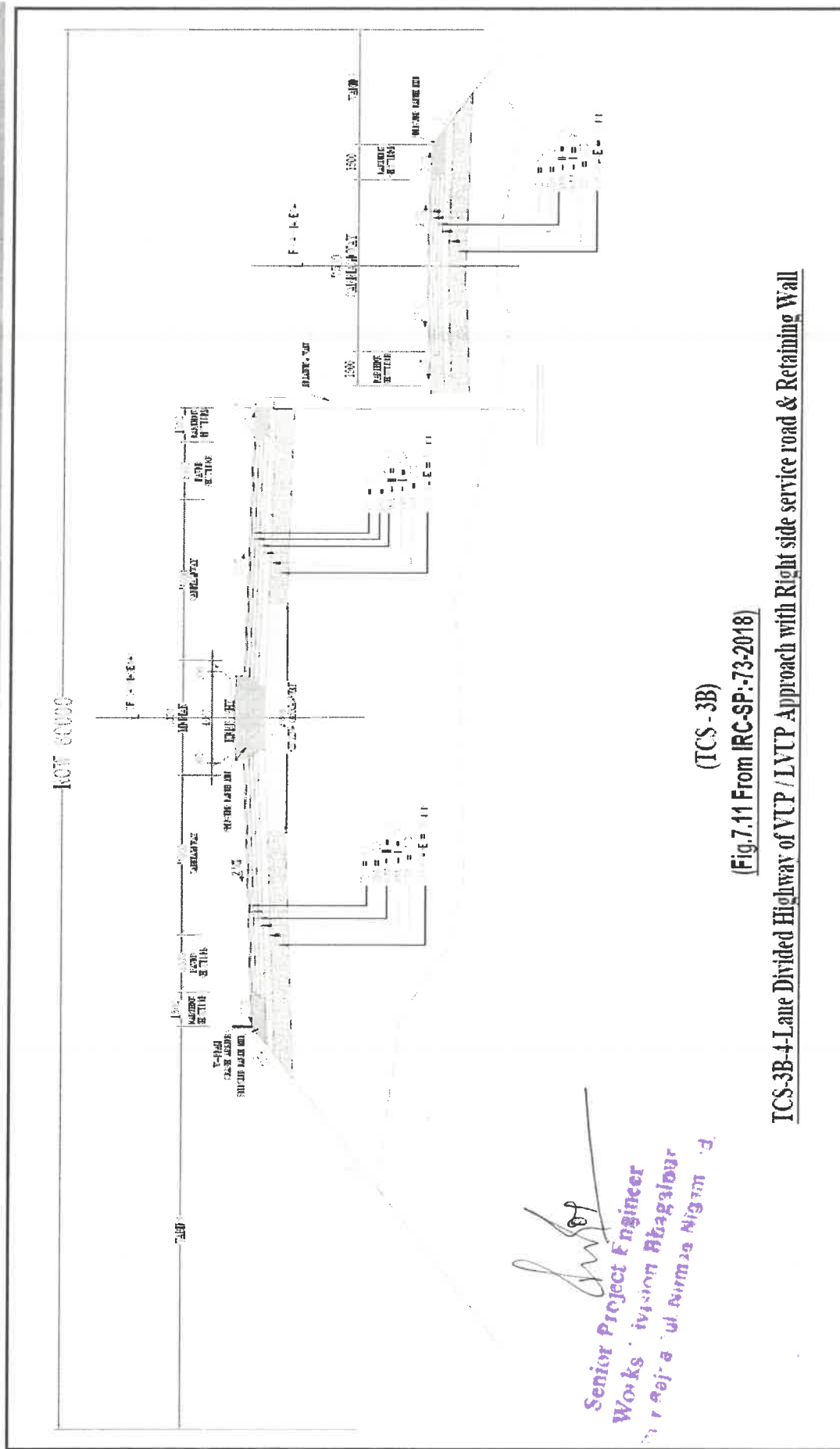


Senior Project Engineer
Works Division Bhopal
Senior Rajya Pal Nirmal

Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.



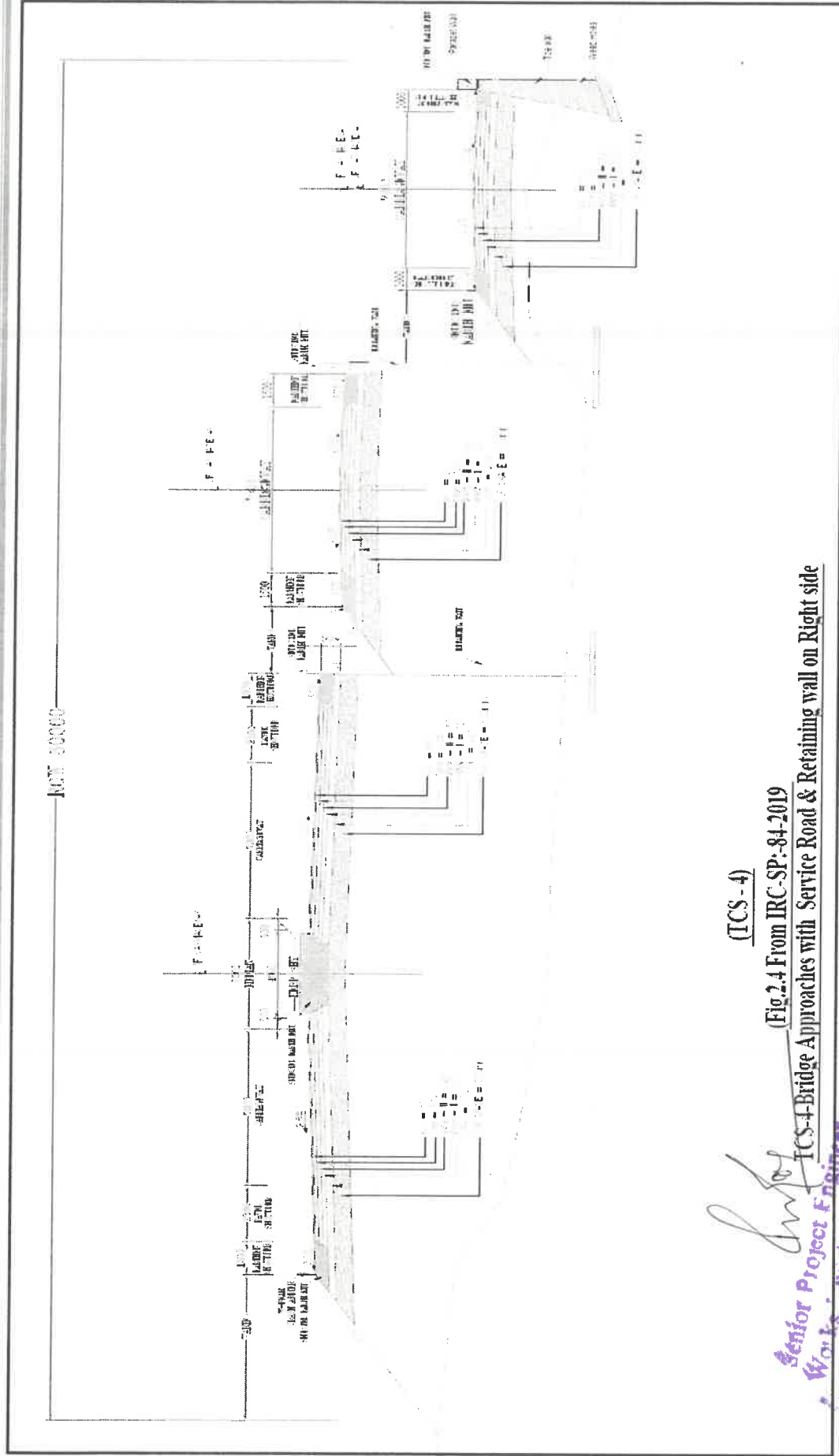




**FINAL DPR BHAGALPUR**

Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

EXECUTIVE SUMMARY



(TCS-4)

(Fig. 2.4 From IRC-SP: 84-2019)

TCS-4 Bridge Approaches with Service Road & Retaining wall on Right side

Major Bridge

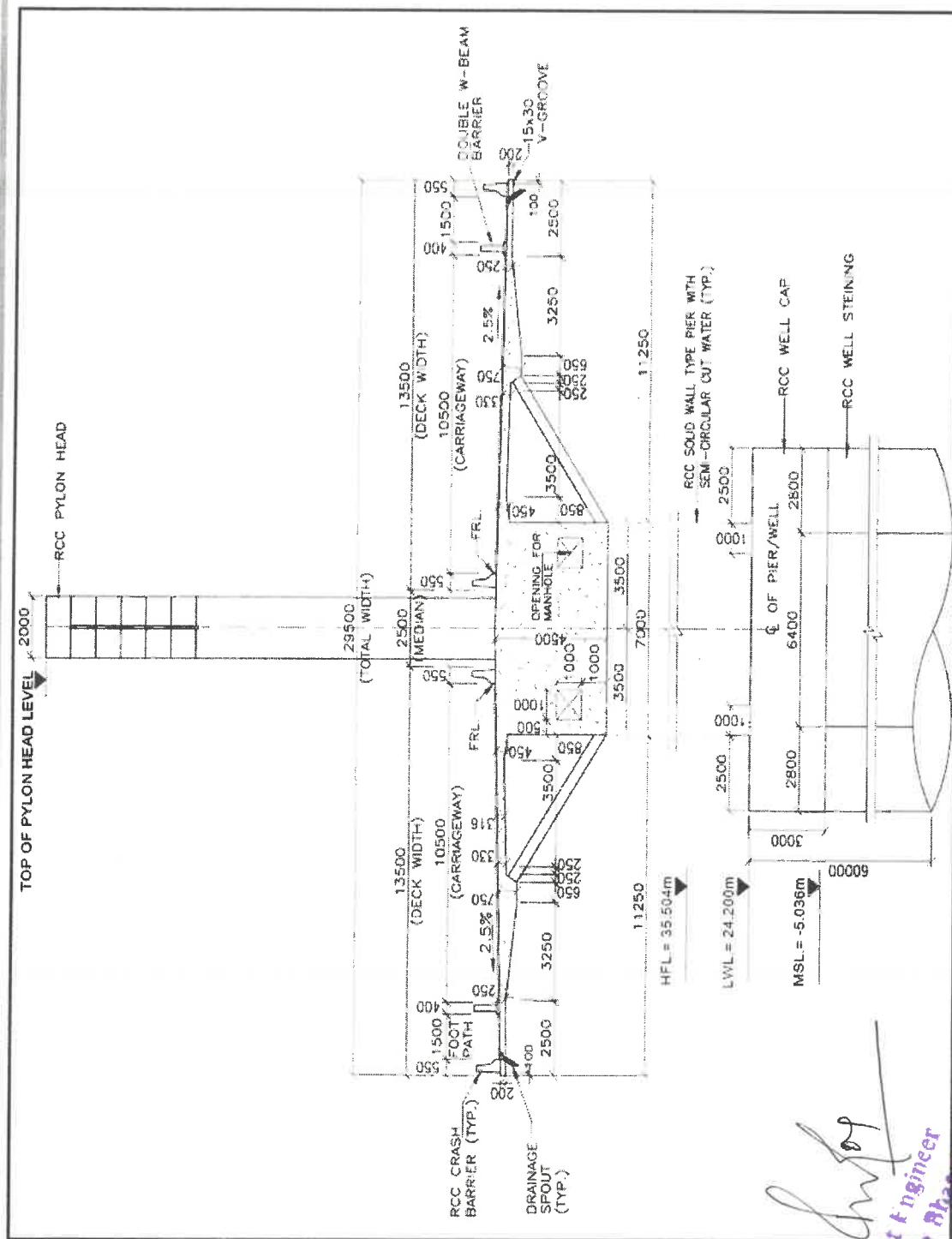
Senior Project Engineer
Works - Vision Bhagatour
Chennai - 600 014





EXECUTIVE SUMMARY

Consultancy Services for Feasibility Study and Detailed Project Report, Survey, for Construction of new 4-lane Bridge with approaches parallel to existing Vikramshila Setu in the district of Bhagalpur in Bihar.

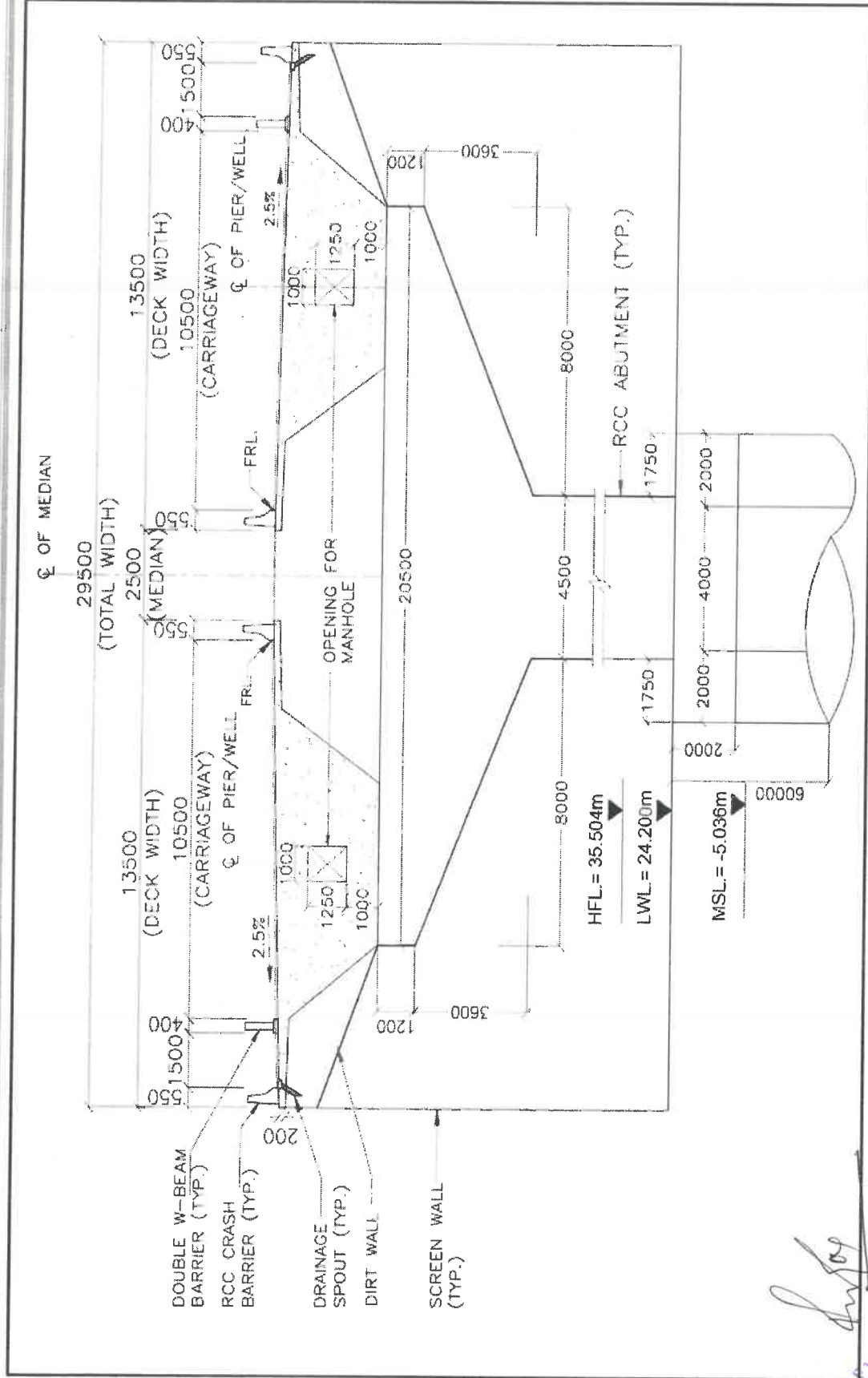


Extradosed

Senior Project Engineer
Works : Irrigation Bhagatpore
Srinagar Rajahmundry Nizams Nagar

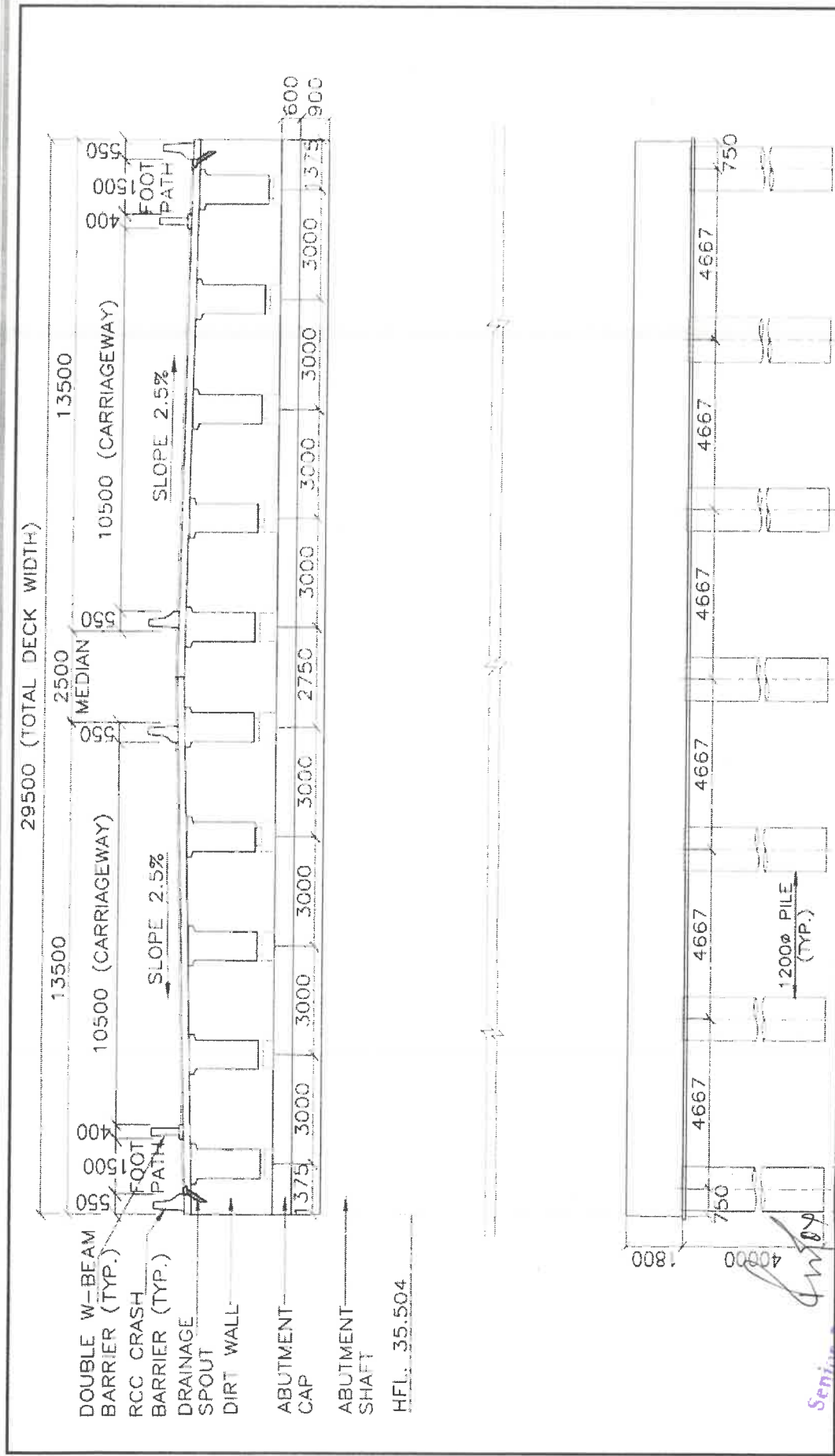
Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.





Integral PSC Box Girder

Construction of 4 Lane Bridge with approaches parallel to Existing Vikramshila Setu in the district of Bhagalpur in Bihar.





0.5.2 Traffic Control and Safety Measures

0.5.2.1 Road Marking & Traffic Signs

Road markings will be made for centre and edge lines using reflective thermoplastic paints. Appropriate road markings will also be provided at junctions and crossings. Road signs are to place according to IRC: 67-2012. The signs are to be placed on embankment so that extreme edge of sign would be 2.0 m away from the edge of the carriageway. The location of each sign is to be decided in accordance with the guidelines their in.

0.5.2.2 Proposal for Truck Lay byes/Parking cum Rest Area

As per the detailed field surveys and reconnaissance, truck lay bye, Bus Bay & Toll Plaza is proposed in Package II. The rest area will provide common facilities like rest area, first aid medical facilities, restaurant, and vehicle parking etc.

Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309

Nil

Package-II: Approaches of Major Bridge on Both Sides – CH. 0+000 to CH. 8+080

- **Truck Lay Byes**

Sr. No.	Proposed Chainage
1	7+150 (LHS)
2	7+320 (RHS)

- **Bus Bay**

Sr. No.	Proposed Chainage
1	3+108 (LHS)
2	3+223 (RHS)

- **Toll Plaza**

Sr. No.	Proposed Chainage
1	2+400

0.5.2.3 Project Lightening

Highway lighting consists of providing illumination through lights in the vicinity of a



highway/road/street.

It plays a major part in ensuring of highway safety during night driving and includes the aspect of roadside amenities for the convenience of the road-users and preserving the aesthetics of the highway and its vicinity during the nights. In addition, highway lighting is important to provide security to the road-users during nights, especially to pedestrians.

Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309

Single Arm Street Light has been proposed at the interval of 30 m throughout the project road excluding Extradosed Bridge Section where theme lightening has been proposed

Package-II: Approaches of Major Bridge on Both Sides - CH. 0+000 to CH. 8+080

Double Arm Street Light & Single Arm Street Light has been proposed at the interval of 30 m

0.5.2.3 Bridge Health Monitoring System

For monitoring of the structural health of the bridge during its service life, sensors will be installed on the stay cables subjected to maximum loads. This Equipment/sensors records the vibrations of the structure under ambient conditions and gives a frequency plot (vibration signature). It has been the endeavour of the Bridge Engineers to search for an effective tool which can give a warning to the inspecting official (pending detailed inspection) in the form of an indicative parameter.

0.5.2.4 Service Road

Package II

Sr. No.	From	To	Length	Side
1	840.00	1273.00	433.00	Both Side
2	1285.00	1670.00	385.00	Both Side
3	3600.00	5150.00	1550.00	Both Side
4	5150.00	5613.00	463.00	Both Side
5	5625.00	6000.00	375.00	Both Side
6	7600.00	8080.00	480.00	Left
Total Length (m)			6892	

**Package I**

Sr. No.	From	To	Length	Side
1	8080.00	8609.50	529.50	Both Side
2	8630.50	8640.00	9.50	Both Side
3	8640.00	8920.00	280.00	Right
4	13000.00	13270.00	270.00	Right
5	13350.00	13510.00	160.00	Right
6	13375.00	13510.00	135.00	Right Side (Double) 7+7.5
7	13510.00	13746.25	236.25	Right
8	13751.75	13960.00	208.25	Both Side
9	13960.00	14308.91	348.91	Right
Total Length (m)			2629	

0.5.2.4 Crash Barrier**Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309**

Package-2 "Thire Beam Crash Barrier				Side
8920.00	8954.80	34.80	TCS-1A	Left
13322.00	13375.00	53.00	TCS-1B	Left
13375.00	13510.00	135.00	TCS-4	Left
13510.00	13746.25	236.25	TCS-3B	Left

0.5.3 Pavement Design

Flexible pavement is proposed for new carriageway of the project road. Design period of 20 years considered for new carriageway. The Pavement improvement proposal for entire project road is presented in Table below.

Table 10: Improvement Proposal for New Pavement (Main Road)

Homogeneous Section	Design Chainage		CBR (%)	MSA	Crust				S. Grade	Total Thickness
	From	To			BC	DBM	WMM	GSB		
Naugachia to Bhagalpur Package I & II	0/000	14/309	8	126	50	100	250	200	500	1100

For Service Road

Crust Composition for New Pavement as per IRC:37 – 2018									
Homogeneous Section	Total Proposed Length (km)	CBR (%)	MSA	Crust				S. Grade	Total Thickness
				BC	DBM	WMM	GSB		
Package II Where TCS – 2, 2A, 2B 3, 3A, 3B, 4 are followed	6582.4	8	10	30	60	250	200	500	1040

**0.5.4 Major Bridge**

There is 1 existing major bridge which crosses Ganges River. The Brief details of improvement proposal for existing bridge is given below.

Package-I: Major Bridge Portion - CH. 8+080 to CH. 14+309

Sl. No.	Description	Details			
1	Type of Bridge	Major Bridge			
2	Bridge Length	4.367 km			
3	Location of proposed Bridge	parallel to Vikramshila Setu @50 m downstream			
4	Span Arrangement	INTEGRAL PSC BOX GIRDER = 34X57.7+18x63.30 (3300m) EXTRADOSED = 1X72+4X120+2X109+1X142+1X120+1x72 (1104m) PSC I GIRDER = 5X32.4m (162 m)			
5	Nos. of Span	67			
6	Super Structure	Integral PSC Box Girder ~ A1 to P52 Extradosed Bridge ~ P52 to P62 PSC I girder ~ P62 to A2			
7	Foundation Type	Type	Location	Dia. (m)	Depth (m)
		Circular well	A1 to P52	8	60
		Circular well	P52 to P61	12	60
		Circular well	P62	8	60
		Pile	P63 to A2	1.2	41.8
8	Nos. of Foundation	68 (Well foundation 63 & Pile foundation 5)			
9	Pylon height	18m			
10	Diameter of well	A1 to P52 - 8 m P52 to P61- 12 m P62 - 8 m			
11	Diameter of Pile	P63 to A2 - 1.2 m			
12	Design Discharge	1,06,839 cumec			
13	Highest Flood Level	35.504 m			
14	Low Water Level	24.2 m			
15	Depth of Girder	Integral PSC Box Girder ~ A1 to P52 - 3.250 m Extradosed Bridge ~ P52 to P62 - 4.5 m PSC I girder ~ P62 to A2 - 2.2 m			
16	Slab Thickness	Integral PSC Box Girder ~ A1 to P52 - 0.225 m Extradosed Bridge ~ P52 to P62 - 0.330 m PSC I girder ~ P62 to A2 - 0.220 m			
17	Scour Level	-5.036 m (29.2 m from LWL)			
18	Well Foundation Level	-35.800 m (60.0 m from LWL)			
19	Clear distance between existing bridge & proposed bridge	29.750 m between bridge decks 37.0 to 42.375 m between foundations			



0.5.5 Culverts

A total of 10 culverts are proposed for new construction.

Package-II: Approaches of Major Bridge on Both Sides – CH. 0+000 to CH. 8+080

Culvert Improvement Proposal				
Sr. No.	Ch.	Span	Formation Width	Type
1	0+200	1x3x4	27	Box
2	0+619	1x3x4	27	Box
3	1+449	1x6x7	48	Box
4	2+100	1x3x4	27	Box
5	2+950	1x3x4	27	Box
6	3+350	1x3x4	27	Box
7	6+259	1x3x5	27	Box
8	6+564	1x3x5	27	Box
9	6+900	1x3x5	27	Box
10	7+475	1x3x5	27	Box

0.5.6 Drainage Works

The longitudinal slope of the road alignment is generally varying in direction with respect to the countryside slope. Keeping this in view, it is proposed to locate the drain close to the toe of the road embankment on both sides in the rural area. In urban stretches, lined rectangular drains have been provided. In urban area the RCC cover drain with footpath & loaded RCC Cover drain has been considered for the ensuring the better drainage of rainwater.

Table 11: Footpath cum RCC Cover Drain

Package-I						
Sr. No	Design Chainage		Length	TCS	Drain Length	Drain Length(m)
	From	To				
1	08+080	08+610	530	TCS-3	BOTH SIDES	1059
2	08+631	08+640	10	TCS-3	BOTH SIDES	19
3	08+640	08+920	280	TCS-3A	RHS	280
4	13+752	13+960	208	TCS-3	BOTH SIDES	417
5	13+960	14+309	349	TCS-2B	RHS	349
Total Drain Length						2123

Package II						
Sr. No	Design Chainage		Length	TCS	Drain Length	Drain Length (m)
	From	To				
1	00+840	01+273	433	TCS-3	BOTH SIDES	866
2	01+285	01+670	385	TCS-3	BOTH SIDES	770



Package II						
Sr. No	Design Chainage		Length	TCS	Drain Length	Drain Length (m)
	From	To				
3	03+600	05+150	1550	TCS-2	BOTH SIDES	3100
4	05+150	05+613	463	TCS-3	BOTH SIDES	926
5	05+625	06+000	375	TCS-3	BOTH SIDES	750
6	07+600	08+080	480	TCS-2A	LHS	480
Total Drain Length						6892

0.5.7 Protection work

The scope of retaining structure by considering various engineering factors such as structural stability, flexibility, aesthetics exposure and economic serviceability by following the design parameters such as sliding resistant and bearing pressure.

Table 12: Toe Wall/ Retaining Wall

Package I					
S. No.	Chainage (Km)		Length in m	Side	Toe Wall/Retaining Wall Length
	From	To			
1	8.080	8.610	2x529.5	Toe wall both side	1059
2	8.631	8.640	2x9.5	Toe wall both side	19
3	8.640	8.920	280	Toe wall on Right side	280
4	8.920	8.955	34.8	Retaining wall/Toe wall on Left side	34.8
5	13.322	13.375	53	Retaining wall/Toe wall on Right side	53
6	13.375	13.510	135	Ret. wall on Right side	135
7	13.510	13.746	236.25	Toe wall on Right side	236.25
8	13.752	13.900	2x208.25	Toe wall both side	416.5
Aggregate length of Toe wall/Retaining wall is 2233.55m					

Package II					
Sr. No.	Design Chainage		Length	Side	Toe Wall / Retaining Wall Length
	From	To			
1	0.840	1.273	433 x 2	Toe wall/ Retaining wall both side	866.000
2	1.285	1.670	385 x 2	Toe wall/ Retaining wall both side	770.000
3	5.150	5.613	463 x 2	Toe wall/ Retaining wall both side	926.000
4	5.625	6.000	375 x 2	Toe wall/ Retaining wall both side	750.000
Aggregate length of Toe wall/Retaining wall is 3312.0 m					

0.6 Environmental Impact Assessment

A corridor of 10 km on either side from the project road is considered for study of various environmental attributes. The study is carried out as per the requirements stipulated by the Ministry of Environment and Forests, Government of India for Environmental Impact Assessment of Rail / Roads / Highway Projects. Important



features from environmental point of view observed along the project road are as mentioned below.

- From the preliminary inventory, local inquiry and as informed by the forest department, it is revealed there is Protected or reserve forest in the stretch of the Project Road.
- Project Corridor on both sides has significant amount of tree plantation. Different type of trees is existing along the project road. Trees will be impacted due to road widening. Along the project road which lies in toe line on either side of the road edge shall be made to avoid felling of trees which are not falling under corridor of impact. The removal of these trees and the loss of vegetation cover will have some effect on local ecological balance, such as the disruption of habitat for small birds, mammals, etc., that will be forced to migrate to other areas. With the addition of trees and shrubs, following re-forestation, the short-term impact of construction is expected to be reversed over the long term.
- There are cultural properties, and community properties / facilities exists within the ROP that are likely to be affected due to proposed project.

0.6.1 Social screening

The project road falls within Bhagalpur district of Bihar. During the initial social screening period, primary consultations were conducted along the project road.

- The consultations were held to build awareness about the project amongst the people, district level administration, and NGOs and to enlist their support in preparation and implementation of the project. Also, it served the purpose of understanding the reaction of the likely affected persons.
- Issues raised by individuals during the consultations were mainly related to land acquisition, loss of livelihood and income restoration, loss of religious structures, community structures, trees, etc.
- A preliminary baseline socio-economic survey identified that structures are likely to be affected due to the project. The remaining includes private and government structures that will be affected due to the proposed project. Most of the structures



affected are of kuccha type i.e. temporary in nature.

0.7 Land acquisition Requirement

The existing right of way (ROW) of the road is varying from 20m to 30m. However, the proposed ROW is 60 m.

0.8 Material investigation

Material investigations were carried out to explore the availability and identify sources of suitable material for the construction of the project.

0.8.1 Borrow pit for soil

Material investigation of borrow area indicates that soil suitable for embankment is available at an average lead of 5 km for the project stretch.

0.8.2 Sand

Sand is available at Banka. The location is 30 km from project site.

0.8.3 Gravel

Several quarries were identified for sourcing aggregates in the project zone. The quarries proposed for the project is Mirzapur Chowki which is 70 km from the project site.

0.8.4 Bitumen

Bulk bitumen is available from Barauni refinery with an average lead of 125 km. Bitumen Emulsion can be made available from Muzaffarpur with a distance of 230 Km.

0.8.5 Cement

The Cement will be getting from Bhagalpur District of Bihar at a lead distance of 13 Km. Ordinary Portland Cement and with various grade of cement like 33, 43 & 53 type of Cement in various brand like Birla Gold, Ambuja, J K etc are available.



0.8.6 Steel

The required type of Steel is to be procured from the Steel Plant in Bhagalpur.

0.8.7 Bearings

Bearings for the Bridge work is taken from **Sanfield (India) Limited, Bhopal.**

0.8.8 Expansion joint

Bearings for the Bridge work is taken from **Sanfield (India) Limited, Bhopal.**

0.8.9 Prestressing System

Prestressing system for Bridge work is taken from **Freyssinet Prestressed Concrete Company Ltd (Maharashtra).**

0.9

0.9 Conclusion and Recommendations

- Based on lane capacity analysis results, the project road requires 4 lane with paved shoulders for capacity augmentation and efficient movement of traffic up to project in non concession period of 20 years i.e. horizon year 2043.
- The project road can be improved without causing significant adverse environmental impacts to the natural, social, economic or cultural environments.
- The project can be constructed within 4.0 years period with strategic planning and through two construction packages.
- Project road section is financially viable based on the forecasted traffic and

MORTGAGE with 40% VGF. Therefore, under EPC contract option proposed for the entire project section with single package and 30 years concession period is adopted. The project road is economically viable for proposed improvement as it yields more than 12% return (assumed interest rate for the analysis). The proposed improvement is also viable for various sensitivity alternatives.

F.No. RW/NH-12014/06/2020/BR/Z-1

भारत सरकार

सड़क परिवहन एवं राजमार्ग मंत्रालय

(जोन-1)

नं. 1, संसद मार्ग, परिवहन भवन, नई दिल्ली-110001

दिनांक 17/07/2020

सेवा में,

सचिव,

पथ निर्माण विभाग (राष्ट्रीय राजमार्ग)

बिहार सरकार, पटना ।

विषय: Construction of New 4 Lane Bridge (parallel to existing Vikramashila Setu) from km 8+ 920 to km 13+375 (including approach road 35m Naugachhia side & 53 m Bhagalpur side) across River Ganga on newly declared NH-131B at Bhagalpur in State of Bihar.

(Job No.NH-131B-BR-2020-21/ 21)

महोदय,

मुझे तकनीकी नोट दिनांक 13.07.2020 (प्रति संलग्न) में दी गई शर्तों के अध्यधीन, निम्न ब्यौरे के अनुसार विषय शीर्षक में उल्लिखित निर्माण कार्य के लिए प्राक्कलन हेतु राष्ट्रपति की प्रशासनिक, तकनीकी अनुमोदन एवं वित्तीय संस्वीकृति सूचित करने का निर्देश हुआ है:-

(रूपये करोड़ में)

- | | |
|--|---------|
| (i) राज्य द्वारा भेजे गए उक्त कार्य के लिए प्राक्कलन में उल्लिखित राशि रु. | 1116.72 |
| (ii) तकनीकी अनुमोदन की राशि (सभी प्रभार सहित) रु. | 1110.23 |
| (iii) वित्तीय एवं प्रशासनिक स्वीकृति की राशि रु. | 1110.23 |

(रुपया ग्यारह सो दस करोड़ तेईस लाख केवल)

2. यह स्वीकृति निम्नलिखित शर्तों पर आधारित हैं:

- i. यह कार्य सक्षम अधिकारी द्वारा अनुमोदित Model SFC Contract document के तहत पूर्ण किया जाएगा
- ii. इस मंत्रालय के ज्ञापन संख्या आर डब्ल्यू/एनएच-33044/10/2002-एस एण्ड आर(आर) दिनांक 26 मई, 2003 एवं 31 दिसम्बर, 2003 द्वारा प्रदर्शन पट प्रदर्शित करने के संबंध में जो अनुदेश जारी किए गए हैं उनका सख्ती से अनुपालन किया जाए।
- iii. मंत्रालय के दिनांक 5/10.7/2001 के परिपत्र संख्या एन 0 एच 0-15015/29/2001-पी0 एल 0 के अनुसार यदि स्वीकृति की तारीख से 6 माह के अन्दर कार्य नहीं सौंपा जाता है तो कार्य अस्वीकृत हो सकता है जब तक कि समय सीमा में वृद्धि के लिए मंत्रालय का पूर्वानुमोदन प्राप्त न किया जाए।
- iv. कार्य के लिए निविदाएं इस मंत्रालय के परिपत्र पत्र संख्या आर.

डब्यू./एनएच/33044/2/2010.एस.एंड आर.(आर) दिनांक 17/06/2011 और पत्र संख्या आर. डब्यू./एन.एच/33044/2/2010/एस. एंड आर.(आर) दिनांक 17/11/2011 के तहत जारी किए गए अनुदेशों के अनुसार ई.निविदा प्रणाली के माध्यम से आमंत्रित की जानी चाहिए। इस आशय का विज्ञापन, इस मंत्रालय के परिपत्र पत्र संख्या आर. डब्यू./एन. एच.11024/3/99 .यूएस-डी.10, दिनांक 09/03/2000 द्वारा जारी किए गए दिशा निर्देशों के अनुसार दिया जाएगा। चूंकि, वर्तमान कार्य की संस्वीकृति लागत 5.00 करोड़ रु. से अधिक है, इसलिए, निविदा मंत्रालय के परिपत्र पत्र संख्या आर. डब्यू./ एन. एच./37010/4/2010-ई.ए.पी.(प्रिटिंग) दिनांक 28/11/2018 के आधार पर इ.पी.सी. विपत्र के अनुसार की जाएगी।

3. यह व्यय मुख्यशीर्ष '5054' सड़कों और पुलों पर पूंजी परिव्यय, 01-राष्ट्रीय राजमार्ग(उप मुख्य शीर्ष), 01.337 सड़क कार्य (लघु शीर्ष) 03-राष्ट्रीय राजमार्ग मूल कार्य 03.01, राष्ट्रीय राजमार्ग मूल कार्य - सामान्य -केन्द्रीय सड़क अवसंरचना निधि से वित्त पोषित 03.01.53 - मुख्य कार्य के नाम डाला जाएगा जिसके लिए चालू वित्त वर्ष 2020-21 के लिए संगत मांग संख्या '84'-सड़क परिवहन एवं राजमार्ग मंत्रालय है।

4. अनुमोदन प्राक्कलन की एक प्रति अलग से मुख्य अभियन्ता (रा0 रा0), बिहार को भेजी जा रही है।

5. सभी स्वीकृति कार्यों की तरह विहित प्रपत्र में 5 करोड़ से ज्यादा के कार्यों के लिए मासिक प्रगति रिपोर्ट एवं 5 करोड़ से कम कार्यों के लिए तिमाही प्रगति रिपोर्ट इस मंत्रालय को भेजी जाए।

6. निम्नलिखित वस्तुगत और वित्तीय लक्ष्य (Cumulative)निधियों की उपलब्धता के आधार पर पूरा किया जाये।

7. यह संस्वीकृति वित्त पक्ष की सहमति से उनके यू0ओ0 नोट # 21 दिनांक 07.07.2020 के द्वारा जारी की जाती है।

8.Targets for the works:- Physical and financial cumulative targets may be achieved as.

years	Cum Physics (%)	Civil cost + Utility etc.	Centage (Contingency, Agency Charges & Supervision Charges	Escalation 2 nd 3 rd 4 th year	Maintenance Charge for 10 years,@0.25% Each for the first five years and @0.50% for the reaming period of five years	Cum, Financial (Rs.in Cr)
2020-	LS	Utility	-	-	-	1.50

2021		Cost				
	20	191.67	14.93	-	-	208.10
2021-2022	30	287.51	22.39	14.38	-	532.37
2022-2023	30	287.51	22.39	15.09	-	857.35
2023-2024	20	191.67	14.93	10.34	-	1074.29
2024-2025	100	958.35	-	-	2.40	1076.69
2025-2026	100	958.35	-	-	2.40	1079.08
2026-2027	100	958.35	-	-	2.40	1081.48
2027-2028	100	958.35	-	-	2.40	1083.87
2028-2029	100	958.35	-	-	2.40	1086.27
2029-2030	100	958.35	-	-	4.79	1091.06
2030-2031	100	958.35	-	-	4.79	1095.85
2031-2032	100	958.35	-	-	4.79	1100.64
2032-2033	100	958.35	-	-	4.79	1105.44
2033-2034	100	958.35	-	-	4.79	1110.23

भवदीय

(Kamal Parkash)

Under Secretary Government of India

तकनीकी नोट की एक प्रति के साथ प्रतिलिपि प्रेषित:

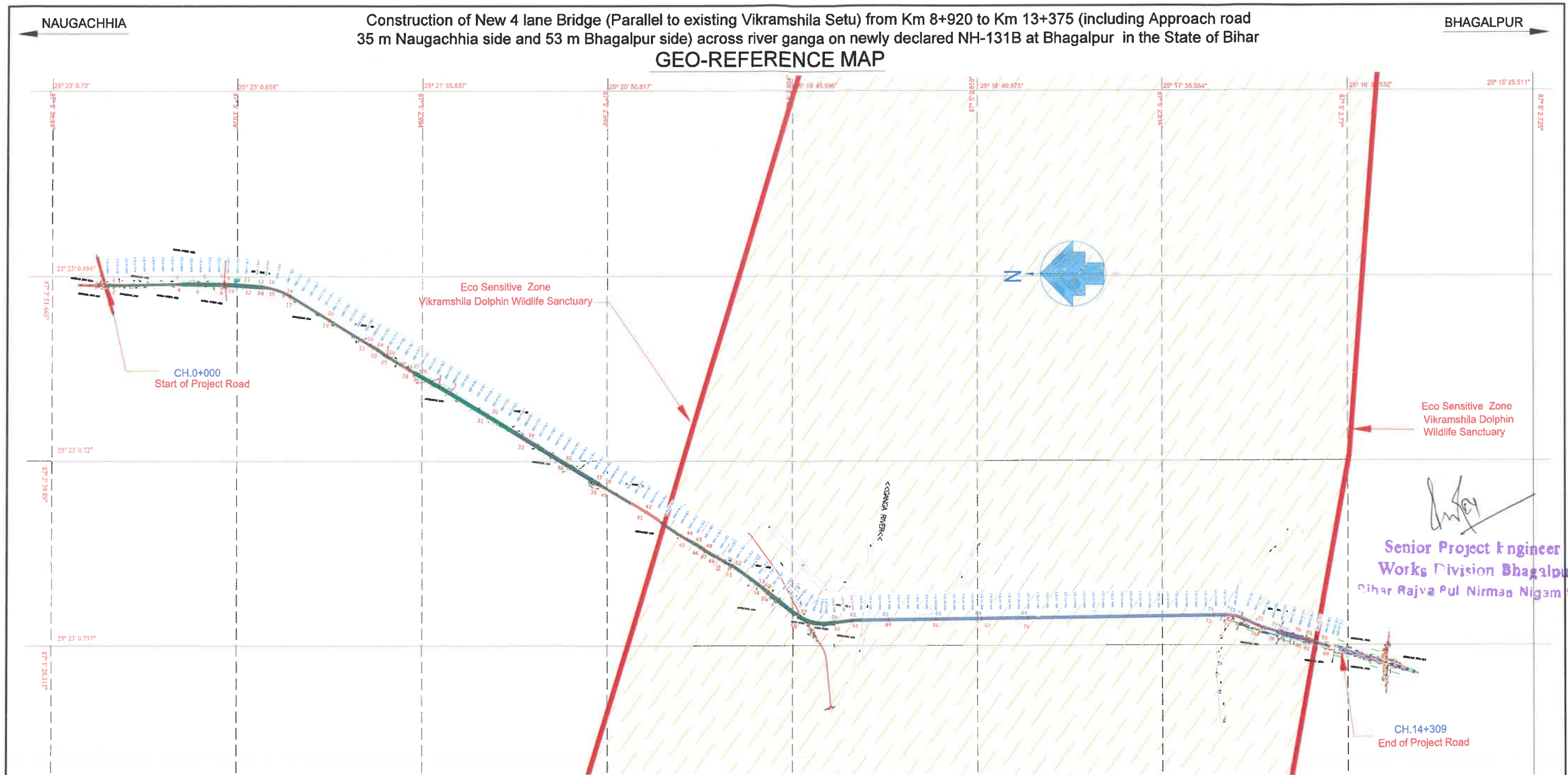
1. महालेखाकार पोस्ट आफिस पटना।

2. वेतन एवं लेखा अधिकारी सड़क परिवहन एवं राजमार्ग मंत्रालय आई.डी.ए. बिल्डिंग जामनगर हाऊस नई दिल्ली।
3. क्षेत्रीय वेतन एवं लेखा अधिकारी सड़क परिवहन एवं राजमार्ग मंत्रालय 4 मंजिल अलंकार प्लेस बोरिंग रोड पटना-800 001।
4. लेखा प्रमुख निदेशक आर्थिक एवं सेवा मंत्रालय ए.जी.सी.आर. बिल्डिंगर् आइ. पी. एस्टेट नई दिल्ली।
5. मुख्य अभियन्ता लोक निर्माण विभाग (सड़क) बिहार सरकार पटना। (संशोधित प्राक्कलन की एक प्रति के साथ)
6. मुख्य अभियन्ता एवं क्षेत्रीय अधिकारी सड़क परिवहन एवं राजमार्ग मंत्रालय 177 अनिकेल हाऊसिंग कोपेरिटव सोसाईटी आई 0 ए 0 स 0 कालोनी किदवाईपुरी पटना।

(Kamal Parkash)

Under Secretary Government of India

मुख्य अभियन्ता (ज़ोन-1)/एसई(ज़ोन-1)/एईई(ज़ोन-1)/एसई(मानिट्रिंग)/मानिट्रिंग प्रकोष्ठ/ डब्ल्यू एंड एअनुभाग/वित्त पक्ष(टी एफ-2 अनुभाग)/परियोजना अनुभाग/ गार्ड फाईल



Point No.	UTM CoOrdinate		Degree, minute and second	
	Easting	Northing	Latitude	Longitude
1	506381.0660	2806826.0190	25° 22' 41.46"	93° 3' 48.351"
2	506357.0720	2806825.5270	25° 22' 41.444"	93° 3' 47.493"
3	506395.8740	2806061.0390	25° 22' 16.59"	93° 3' 48.868"
4	506371.8760	2806060.8010	25° 22' 16.583"	93° 3' 48.009"
5	506403.7290	2805825.5880	25° 22' 8.935"	93° 3' 49.145"
6	506363.7350	2805826.2880	25° 22' 8.959"	93° 3' 47.714"
7	506398.2900	2805560.2350	25° 22' 0.309"	93° 3' 48.946"
8	506358.0570	2805554.9050	25° 22' 0.136"	93° 3' 47.506"
9	506397.5730	2805546.2760	25° 21' 59.855"	93° 3' 48.92"
10	506357.4630	2805541.6550	25° 21' 59.705"	93° 3' 47.485"
11	506386.2160	2805324.9050	25° 21' 52.658"	93° 3' 48.51"
12	506346.3180	2805327.7590	25° 21' 52.752"	93° 3' 47.083"
13	506373.8910	2805154.6170	25° 21' 47.122"	93° 3' 48.066"
14	506334.1230	2805158.3620	25° 21' 47.245"	93° 3' 46.643"
15	506333.3340	2805084.9030	25° 21' 44.857"	93° 3' 46.614"
16	506356.9920	2805080.8650	25° 21' 44.725"	93° 3' 47.46"
17	506247.6060	2804850.2620	25° 21' 37.23"	93° 3' 43.543"
18	506268.3170	2804838.1370	25° 21' 36.835"	93° 3' 44.283"
19	506383.8480	2804425.9130	25° 21' 23.438"	93° 3' 34.098"
20	506004.1910	2804413.1790	25° 21' 23.023"	93° 3' 34.826"

Point No.	UTM CoOrdinate		Degree, minute and second	
	Easting	Northing	Latitude	Longitude
21	505721.9600	2803999.8051	25° 21' 9.589"	93° 3' 24.722"
22	505740.1742	2803982.8927	25° 21' 9.038"	93° 3' 25.373"
23	505664.8561	2803905.8408	25° 21' 6.534"	93° 3' 22.677"
24	505694.9202	2803895.5987	25° 21' 6.201"	93° 3' 23.753"
25	505597.2473	2803812.9455	25° 21' 3.515"	93° 3' 20.257"
26	505623.2959	2803796.1386	25° 21' 2.969"	93° 3' 21.189"
27	505464.8287	2803542.2583	25° 20' 54.717"	93° 3' 15.515"
28	505453.9770	2803554.1415	25° 20' 55.104"	93° 3' 14.77"
29	505434.6444	2803473.1359	25° 20' 52.47"	93° 3' 14.434"
30	505399.8917	2803492.9411	25° 20' 53.114"	93° 3' 13.191"
31	504940.4745	2802719.8493	25° 20' 27.987"	93° 3' 56.745"
32	504974.6010	2802698.9834	25° 20' 27.308"	93° 3' 57.965"
33	504679.6508	2802298.2687	25° 20' 14.121"	93° 3' 47.409"
34	504713.7773	2802272.4028	25° 20' 13.443"	93° 3' 48.629"
35	504453.0022	2801845.7966	25° 19' 59.576"	93° 3' 39.295"
36	504418.8721	2801866.6565	25° 20' 0.255"	93° 3' 38.075"
37	504244.4037	2801504.4852	25° 19' 48.483"	93° 3' 31.829"
38	504210.2785	2801535.3551	25° 19' 48.361"	93° 3' 30.609"
39	504198.4654	2801444.6732	25° 19' 46.538"	93° 3' 30.185"
40	504177.9873	2801457.1891	25° 19' 46.945"	93° 3' 29.453"

Point No.	UTM CoOrdinate		Degree, minute and second	
	Easting	Northing	Latitude	Longitude
41	503904.1899	2801009.3644	25° 19' 32.389"	93° 3' 19.654"
42	503924.5551	2800996.6657	25° 19' 31.976"	93° 3' 20.382"
43	503610.1653	2800556.3385	25° 19' 17.664"	93° 3' 10.052"
44	503635.8786	2800552.4879	25° 19' 17.538"	93° 3' 10.052"
45	503553.9665	2800403.3591	25° 19' 12.691"	93° 3' 7.121"
46	503527.4324	2800419.3886	25° 19' 13.212"	93° 3' 6.172"
47	503485.2453	2800363.0925	25° 19' 11.382"	93° 3' 4.662"
48	503511.7793	2800347.0630	25° 19' 10.851"	93° 3' 5.611"
49	503433.5372	2800277.4988	25° 19' 8.6"	93° 3' 2.812"
50	503400.7478	2800209.6840	25° 19' 6.396"	93° 3' 1.639"
51	503323.6980	2800081.3402	25° 19' 2.224"	93° 3' 1.5882"
52	503346.9065	2800060.4315	25° 19' 1.544"	93° 3' 1.59.711"
53	503107.5297	2799731.7536	25° 18' 50.86"	93° 3' 51.147"
54	503083.2152	2799750.5784	25° 18' 51.472"	93° 3' 50.277"
55	503029.9871	2799695.9377	25° 18' 49.729"	93° 3' 48.373"
56	503064.6765	2799676.4037	25° 18' 49.061"	93° 3' 49.614"
57	502803.6299	2799343.1430	25° 18' 38.228"	93° 3' 40.274"
58	502767.3147	2799360.6317	25° 18' 38.797"	93° 3' 38.976"
59	502740.0733	2798958.8940	25° 18' 25.737"	93° 3' 37.998"
60	502689.5537	2798956.9462	25° 18' 25.674"	93° 3' 36.192"

Point No.	UTM CoOrdinate		Degree, minute and second	
	Easting	Northing	Latitude	Longitude
61	502725.2401	2798775.3312	25° 18' 19.769"	93° 3' 37.467"
62	502755.1022	2798773.4564	25° 18' 19.708"	93° 3' 38.535"
63	502763.4375	2798372.2910	25° 18' 6.666"	93° 3' 38.83"
64	502733.9395	2798371.9456	25° 18' 6.655"	93° 3' 37.775"
65	502769.2927	2797872.3253	25° 17' 50.411"	93° 3' 39.035"
66	502739.7947	2797971.9799	25° 17' 50.4"	93° 3' 37.981"
67	502745.6498	2797372.0142	25° 17' 34.146"	93° 3' 38.186"
68	502775.1478	2797372.3596	25° 17' 34.157"	93° 3' 39.241"
69	502781.0029	2796872.3993	25° 17' 17.903"	93° 3' 39.447"
70	502751.5009	2796872.3999	25° 17' 17.903"	93° 3' 38.392"
71	502804.4235	2794872.5310	25° 16' 12.886"	93° 3' 40.27"
72	502774.9255	2794872.1856	25° 16' 12.675"	93° 3' 39.215"
73	502805.6579	2794748.6854	25° 16' 8.859"	93° 3' 40.313"
74	502776.1714	2794757.3389	25° 16' 9.141"	93° 3' 39.259"
75	502690.5099	2794388.9820	25° 15' 57.166"	93° 3' 36.193"
76	502668.3308	2794398.1617	25° 15' 57.465"	93° 3' 35.4"
77	502623.3251	2794151.4719	25° 15' 49.445"	93° 3' 33.79"
78	502584.6245	2794161.0089	25° 15' 49.755"	93° 3' 32.406"
79	502564.4070	2793948.1915	25° 15' 42.836"	93° 3' 31.682"
80	502525.9974	2793959.3585	25° 15' 43.2"	93° 3' 30.309"

Point No.	UTM CoOrdinate		Degree, minute and second	
	Easting	Northing	Latitude	Longitude
81	502535.7868	2793878.4069	25° 15' 40.568"	93° 3' 30.158"
82	502512.7410	2793885.1071	25° 15' 40.786"	93° 3' 29.834"
83	502459.3179	2793615.3889	25° 15' 32.017"	93° 3' 27.922"
84	502436.2721	2793622.0891	25° 15' 32.235"	93° 3' 27.089"



LEGENDS

Agriculture land
Residential Area
River

GPS Points



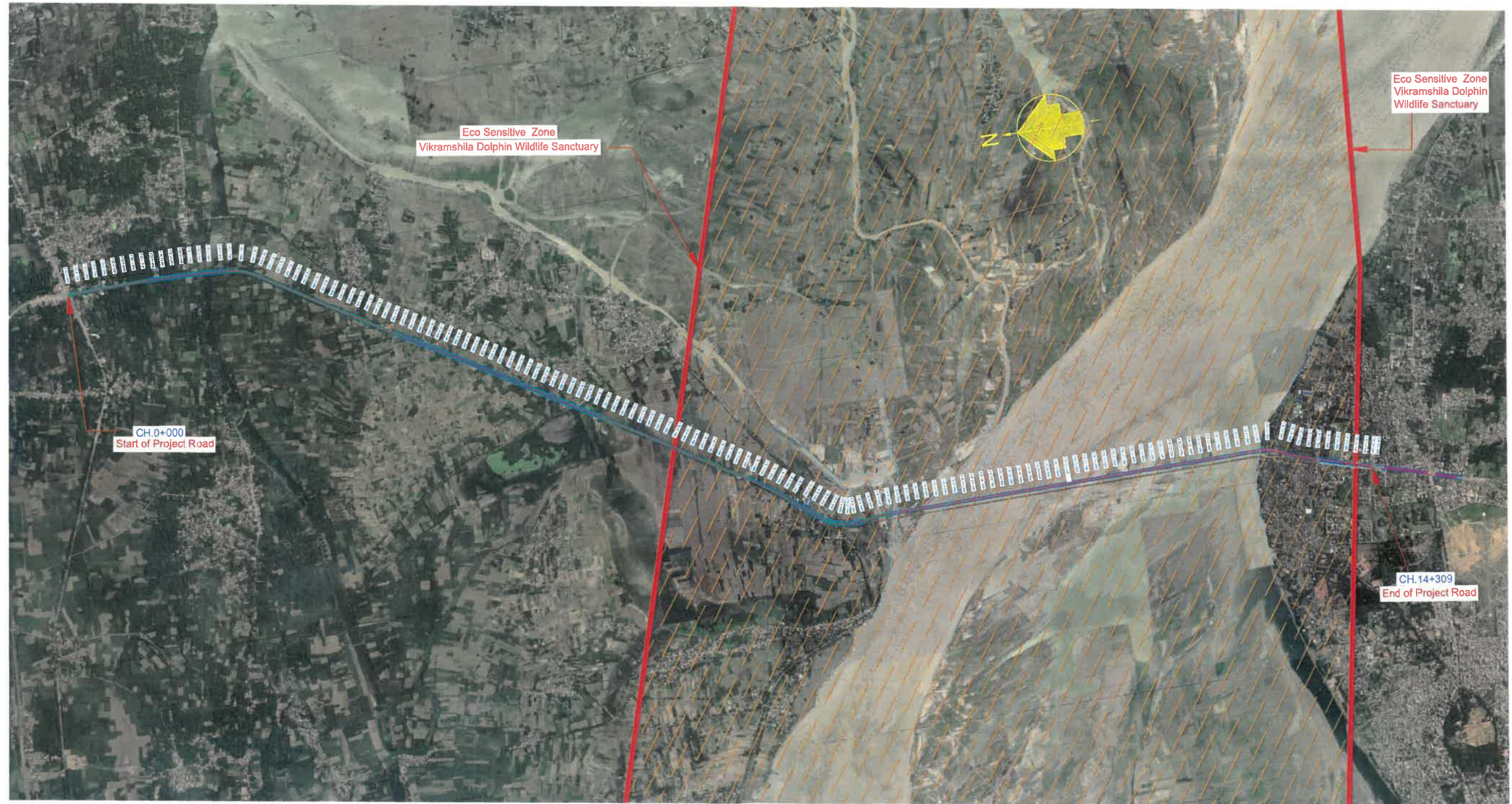
ISSUE	DATE	AMENDMENT \ ISSUE DESCRIPTION	APPROVAL	CLIENT	CONSULTANT	Project	Drawing Title
R0	Dec.-2020			BIHAR RAJYA PUL NIRMAL NIGAM LIMITED	RODIC CONSULTANTS PVT. LTD. IN JV WITH MONARCH SURVEYORS & ENGINEERING CONSULTANTS PVT. LTD. 1, JAI SINGH MARG (FIRST FLOOR), YMCA CULTURAL CENTRE BUILDING NEW DELHI - 110001 (INDIA)	BHAGALPUR GEO-REFERENCE MAP (Km.0+000 To Km.14+309)	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT (FOR EPC MODE) FOR THE CONSTRUCTION OF NEW 4-LANE BRIDGE WITH APPROACHES PARALLEL TO EXISTING VIKRAMSHILASETU IN THE DISTRICT OF BHAGALPUR IN BIHAR
							BHAGALPUR GEO-REFERENCE MAP
							Date: Dec - 2020 Project No: 1537 Drawing No: BRP/NL/BHAGALPUR BRIDGE/ GRP02

NAUGACHHIA

Construction of New 4 lane Bridge (Parallel to existing Vikramshila Setu) from Km 8+920 to Km 13+375 (including Approach road 35 m Naugachhia side and 53 m Bhagalpur side) across river ganga on newly declared NH-131B at Bhagalpur in the State of Bihar

BHAGALPUR

GOOGLE MAP



Senior Project Engineer
Works Division Bhagalpur

BIHAR RAJYA PUL NIRMAL NIGAM LIMITED

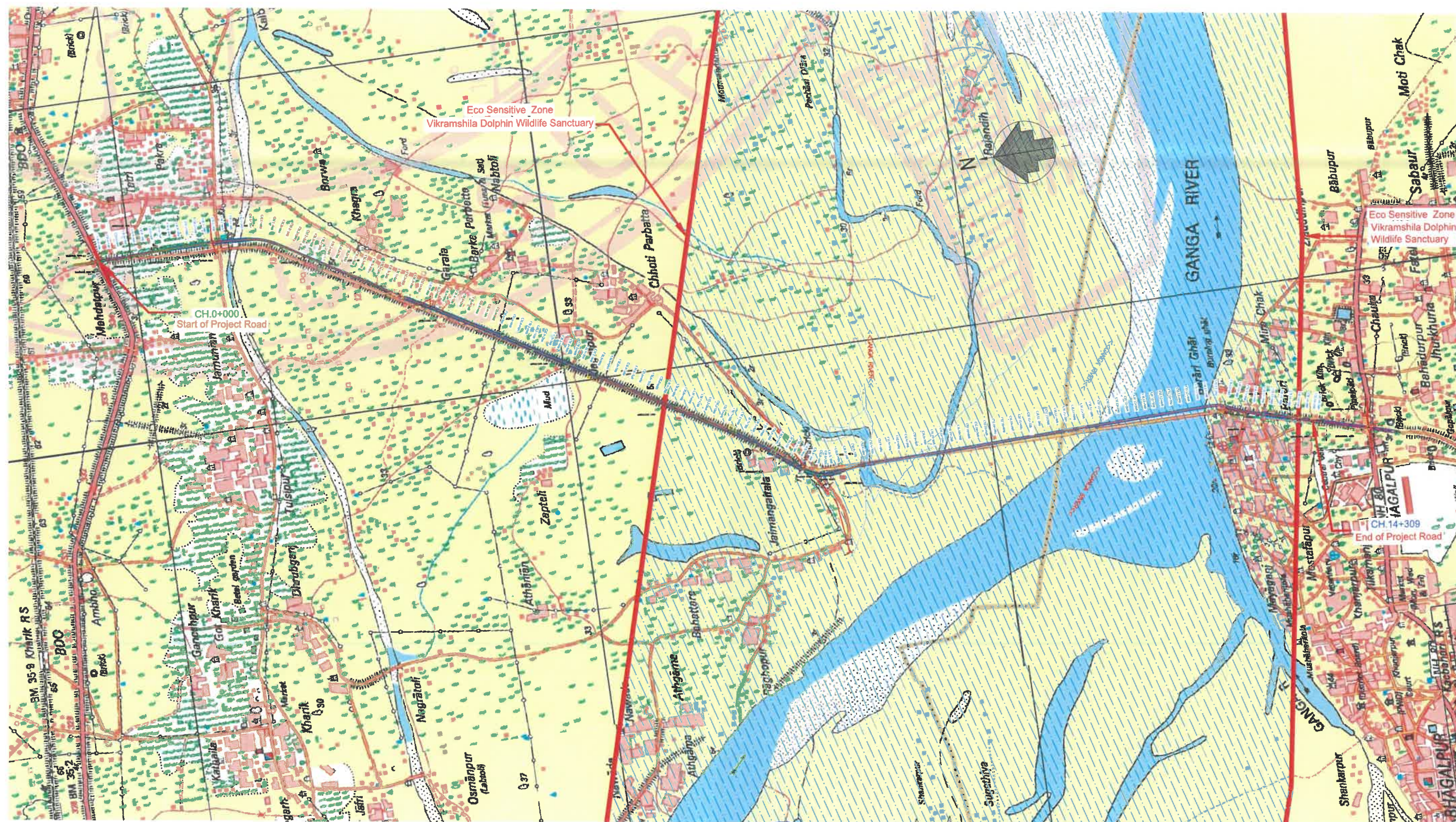
ISSUE	DATE	AMENDMENT \ ISSUE DESCRIPTION	APPROVAL	CLIENT	CONSULTANT	Project	Drawing Title
R0	Dec.-2020			BIHAR RAJYA PUL NIRMAL NIGAM LIMITED	RODIC CONSULTANTS PVT. LTD. IN JV WITH MONARCH SURVEYORS & ENGINEERING CONSULTANTS PVT. LTD. 1, JAI SINGH MARG (FIRST FLOOR), YMCA CULTURAL CENTRE BUILDING NEW DELHI - 110001 (INDIA)	BHAGALPUR - GOOGLE MAP (Km.0+000 TO Km.14+309)	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT (FOR EPC MODE) FOR THE CONSTRUCTION OF NEW 4-LANE BRIDGE WITH APPROACHES PARALLEL TO EXISTING VIKRAMSHILASETU IN THE DISTRICT OF BHAGALPUR IN BIHAR
						Scale H-1:20000	BHAGALPUR - GOOGLE MAP
						Designed: Drawn: Checked: Approved:	Date DEC - 2020
							Project No. 1537
							Drawing No. BRPHN/BHAGALPUR BRIDGE/ GM/02

NAUGACHHIA

Construction of New 4 lane Bridge (Parallel to existing Vikramshila Setu) from Km 8+920 to Km 13+375 (including Approach road 35 m Naugachhia side and 53 m Bhagalpur side) across river ganga on newly declared NH-131B at Bhagalpur in the State of Bihar

BHAGALPUR

TOPO SHEET MAP



Senior Project Engineer
Works Division Bhagalpur

ISSUE	DATE	AMENDMENT / ISSUE DESCRIPTION	APPROVAL	CLIENT	CONSULTANT	Project	Drawing Title
RO	Dec.-2020			BIHAR RAJYA PUL NIRMAN NIGAM LIMITED	RODIC CONSULTANTS PVT. LTD. IN JV WITH MONARCH SURVEYORS & ENGINEERING CONSULTANTS PVT. LTD. 1, JAI SINGH MARG (FIRST FLOOR), YMCA CULTURAL CENTRE BUILDING NEW DELHI - 110001 (INDIA)	BHAGALPUR TOPO SHEET MAP (Km.0+000 TO Km.14+309)	CONSULTANCY SERVICES FOR PREPARATION OF DETAILED PROJECT REPORT (FOR EPC MODE) FOR THE CONSTRUCTION OF NEW 4-LANE BRIDGE WITH APPROACHES PARALLEL TO EXISTING VIKRAMSHILASETU IN THE DISTRICT OF BHAGALPUR IN BIHAR
						Scale H-1:20000	BHAGALPUR TOPO SHEET MAP
						Designed: Drawn: Checked: Approved:	Date DEC - 2020
							Project No. 1537
							Drawing No. BRPNL/BHAGALPUR BRIDGE/ GRP02