Table of Contents

CHAPTER 0.0:

EXECUTIVE SUMMARY

0.1 Background

National Highways and Infrastructure Development Corporation (NHIDCL) has proposed the feasibility study, preparation of DPR & providing pre-construction services for up-gradation of selected road stretches/corridors to two lane with paved shoulder NH configuration under BHARATMALA Project and National Highways connectivity to Backward areas/Religious/Tourist places of the country in the state of Tripura.
Under this scheme, the consultancy work is awarded to M/s. Technocrats Advisory Services Pvt. Ltd. in association with Vaishnavi Infratech Services Pvt. Ltd. for preparation of Detailed Project Report of **Teliamura - Sabroom section (NH-208).**

The existing length of project road is 132.882 Km and design length (after geometric improvements) is 107.654 km (excluding 1.24km length for widening of NH-208 overlapped with NH-8 from Khowai chowmuhani to south pulinpur).

0.2 Consultancy Services

The consultancy services are to be provided in three stages as brought out below.

Stage 1: Inception Report (IR) & Quality Assurance Plan (QAP)

Stage 2: Feasibility Report

Stage 3: Detailed Project Report (DPR)

- **Stage – 1** i.e. Inception Report & Quality Assurance Plan has been submitted,
- **Stage – 2** i.e. Feasibility Report (Draft & Final) has been submitted,
- **Stage – 3** i.e. Detailed Project Report (Draft) has been submitted,

Detailed Project Report (Final) is described as below –

- Main Report
- Annexure to Main Report
- Design Report (Pavement & Bridge)
- Material Report
- Environmental Assessment Report including Environmental Management Plan (EMP) & Resettlement Action Plan (RAP)
- Technical Specifications

- Rate Analysis
- Cost Estimates
- Bill of Quantities
- Drawing Volume
- Civil work contract agreement
- Project Clearances

0.3 Objectives

The main objective of the consultancy service is to establish the technical, economical, and financial viability of the project and prepare detailed project reports for **Teliamura-Sabroom section.**

The viability of the project shall be established taking into account the requirements with regard to proposed alignment of Project road based on highway design, pavement design, provision of service/Slip roads wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges and structures, road safety features, quantities of various items of works and cost estimates and economic analysis.

0.4 Scope of Services

The Consultant is required to suggest alternative alignments (minimum 3 nos.) for proposed Bypasses, As far as possible, existing road having adequate ROW shall be include in the alignment. The widening / improvement work to 2 lane with paved shoulder shall be within the existing right of way avoiding land acquisition, except for locations having inadequate width and where provisions of short alignment corrections, improvement of intersections are considered necessary and practicable and cost effective. However, new alignment should also be considered, wherever improvement to 2 lane of the existing road is not possible. The Consultant shall furnish land acquisition details as per revenue records/maps for further processing.

The general scope of services is given in the sections that follow. However, the entire scope of services would, inter-alia, include the items mentioned in the Letter of Invitation and the TOR. The Consultant will also make suitable proposals for widening/ improvement of the existing road to 2 lanes etc. and strengthening of the carriageways, as required at the appropriate time to maintain the level of service over the design period.

All ready to implement 'good for construction' drawings shall be prepared.

Environmental Impact Assessment, Environmental Management Plan and Rehabilitation and Resettlement Studies shall be carried out by the Consultant meeting the requirements of MoEF / other statutory bodies.

Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Approval of all drawings including GAD and detail engineering drawings will be got done by the consultant from the Railways. However, if Railways require proof checking of the drawings prepared by the consultants, the same will be got done by NHIDCL. Consultant will also obtain 'No Objection Certificate 'from Ministry of Environment and Forest and also incorporate the estimates for shifting of utilities of all types involved from concerned local authorities in the DPR. Consultant is also required

to prepare all Land Acquisition papers (i.e. all necessary schedules as per L.A. act) for acquisition of land either under NH Act or State Act.

The Consultant shall prepare and submit the cost estimate and bid documents at Feasibility report stage

Consultant shall obtain all types of necessary clearances required for implementation of the project on the ground from the concerned agencies. The client shall provide the necessary supporting letters and any official fees as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation.

0.5 Key Professional Staff

Table 0.1 – Key Professional staff

S. No.	Position	Name
1	Team Leader	**Mr. Babban Ram**
2	Geo-Technical and Pavement Expert	**Mr. Brijesh Mishra**
3	Environmental Specialist	**Mrs. Meena Bhaduri**
4	Traffic cum Safety Expert	**Mr. Salil Pathak**
5	Hill Road / Tunnel Expert	**Mr. P.K Dubey**
6	Revenue / Survey Expert	**Mr. Mahaveer Singh**
7	Bridge Design Engineer	**Mr. D.P. Singh**
8	Contract Specialist	**Mr. Vir Bahadur Singh**

0.6 Project Alignment Description

- As per contract agreement, the Project alignment starts from Ompi chowmuhani (T-Junction with NH-08 at Teliamura) passes through Twidu, Sonacherra, Amarpur, Nutan Bazar, Karbook, Ailmara, Khedacherri, Ropaichari and ends at Harina (T-Junction with NH-08 near km 132.882). Sabroom is 8.1 km away from Harina junction.
- The Project road runs parallel to International border (India – Bangladesh) in some of its length.
- **The length of project road in first 2.4 km passes through Teliamura town, a heavy congestion of traffic / buildings exist at this section. To avoid these congestions, a bypass of 1.3 km is proposed for Teliamura town. This bypass starts at NH-08 (at South Pulinpur, 1.24 km from Khowai chowmuhani towards Agartala) and merges at existing km 2+600 of Project road.**
- The existing length of project road is 132.882 km
- The design length (after geometrical improvement) is 108.894 km (including 1.24km length for widening of NH-208 overlapped with NH-8 from Khowai chowmuhani to south pulinpur).
- Existing lane of Project road is maximum single lane with poor riding quality of PMGSY category.

The Proposals for improvement of Project road is as under –

a) **Widening of existing road (NH-208 overlapped with NH-8) from two lane to two lane with paved shoulder, Length 1.24 km (from khowai chowmuhani to south pulinpur),**

b) **Widening of existing road & new construction as two lane with paved shoulder from south pulinpur to Harina (junction with NH-8), length 107.654 km**

- **This Chapter describes the details of Package II (from Khowai Chowmuhani to design km 36.000, design length – 37.24 km including 1.24km of overlapped length with NH-8)**

The Project Road alignment shown in figure below-

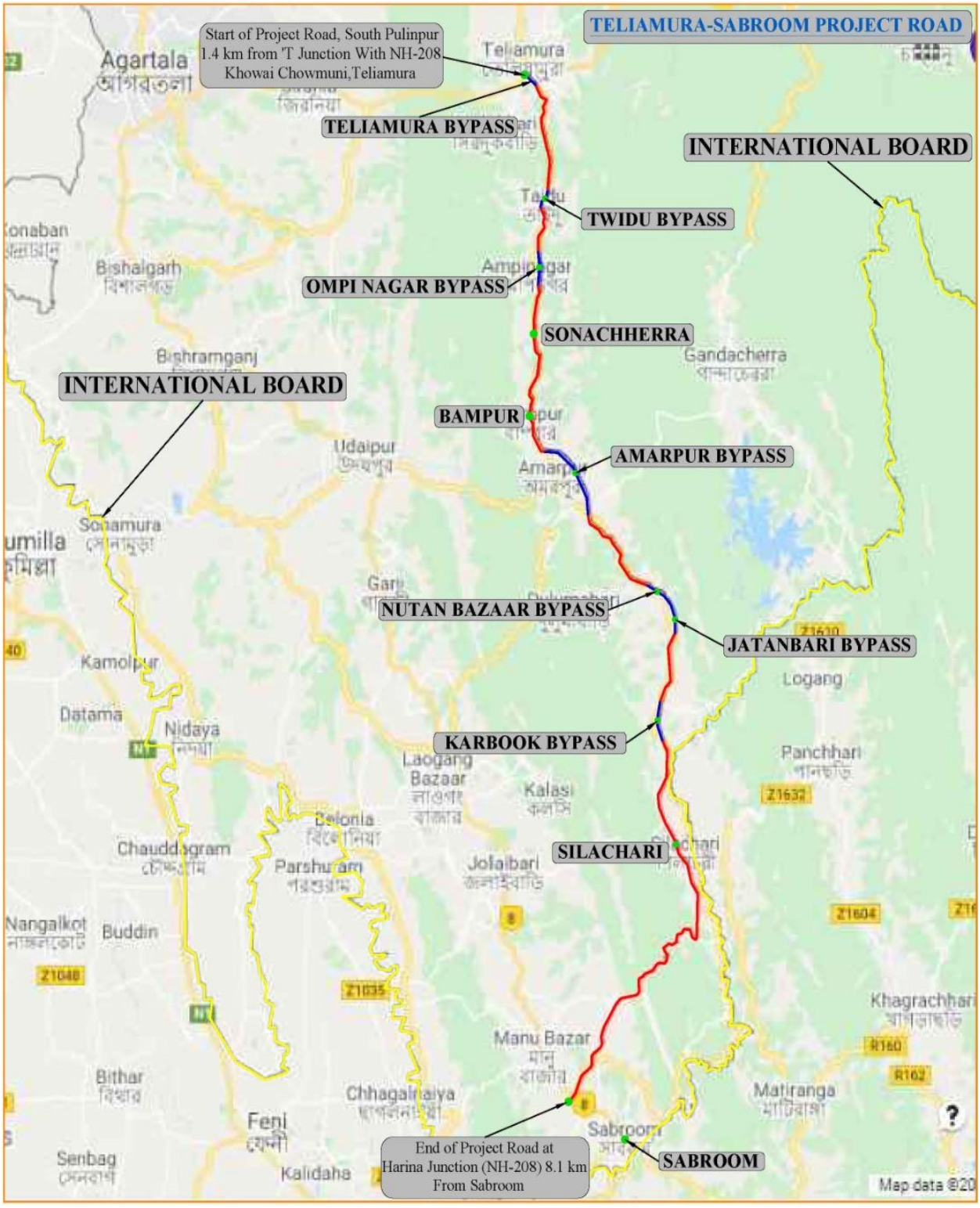


Figure 0.1– Proposed Alignment of Project Road

0.7 Right of Way (ROW)

There is no marking of existing RoW at ground along the Project road, the details of existing RoW is not available with PWD also, however, as per visual inspection and local people enquire, it is found the available land is only 8-10m.

The proposed RoW has been considered 30-45m for Package – II stretch and details are presented below:

Table 0.2:- Details of Proposed RoW

Sl. No.	Chainage		Length (m)	Total PROW (m)
	From	To		
1	0	550	550	45
2	550	900	350	35
3	900	1340	440	45
4	1340	2600	1260	30
5	2600	3100	500	45
6	3100	4600	1500	45
7	4600	4900	300	45
8	4900	7320	2420	30
9	7320	7440	120	40
10	7440	11320	3880	30
11	11320	12850	1530	45
12	12850	13500	650	30
13	13500	15200	1700	30
14	15200	15400	200	45
15	15400	17100	1700	30
16	17100	18000	900	45
17	18000	19860	1860	45
18	19860	19950	90	30
19	19950	20740	790	30
20	20740	21080	340	40
21	21080	23860	2780	30
22	23860	24300	440	40
23	24300	25210	910	30
24	25210	25315	105	30
25	25315	26400	1085	30
26	26400	27000	600	45
27	27000	35260	8260	30
28	35260	36000	740	45

0.8 Abutting Land Use Pattern

Project road passing maximum in rolling terrain. Approx in 20% of total length, it passes through mountainous terrain also (From km 4+500 to km 12+500, km 13+500 to km 14+700).

Built-up and partially built-up are existing along the both side of Project road.

The land use pattern in chart view is shown below –

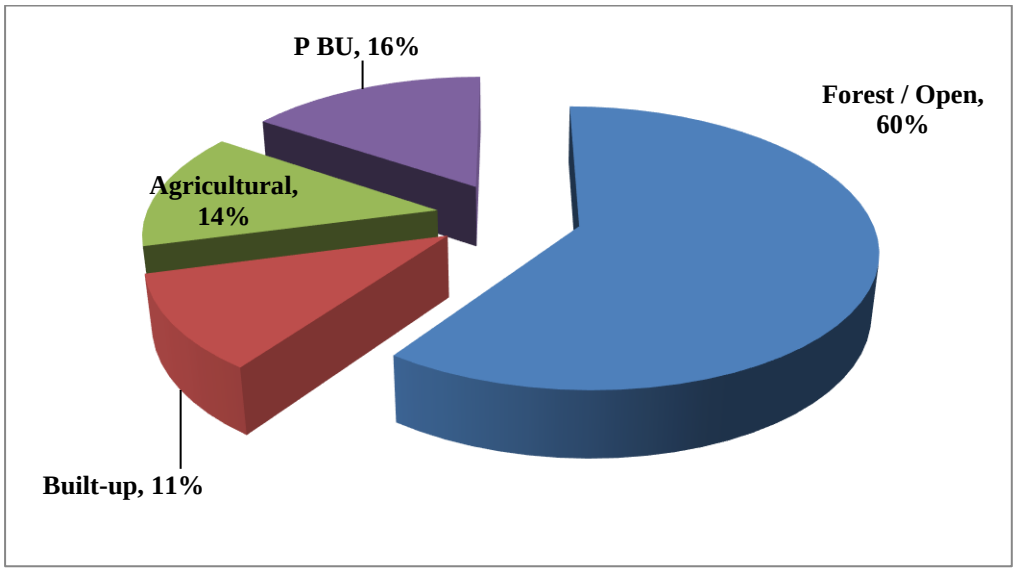


Fig 0.2 Land Use Pattern

Table 0.3 :- Details of Land

Sl. No.	Design Chainage (Km)		Length (Km)	Terrain	Remarks
1	km127.319 to km 128.559		1.24	Plain	NH-208 overlapped with NH-8
2	0.00	4.80	4.80	Rolling	
3	4.50	12.50	8.00	Hilly	
4	12.50	13.50	1.00	Rolling	
5	13.50	14.70	1.20	Hilly	
6	14.70	36.00	21.30	Rolling	

0.9 Terrain

Terrain is plain, rolling and mountainous.

0.10 Carriageway

The carriageway of the Project highway as per data collected at the time of reconnaissance survey is as shown below –

Table 0.4 :-Carriageway Width

Sl. No.	Chainage (km)		Carriage way width (m)	Remarks
	From	To		
1	0+000	5+500	5.5	
2	5+500	36+000	3.5	

0.11 Design Standards

Following design standards have been adopted as per Indian Roads Congress (IRC) guidelines, contained in IRC: 73, IRC: 86, IRC: 38, IRC 58-2011 and IRC: SP: 23 and is given in Table0.5.

Table 0.5- Design Parameters

Item	Plain / Rolling / Mountainous Terrain	Reference
Design Speed (kmph)	Ruling -100 Kmph (Plain) / 60kmph (Hill) Min.- 80 kmph (Plain) / 40kmph (Hill)	Table 2.1
Sight distance (minimum)	180 m	Table 2.6
Proposed Land width (ROW)	20-80 m (refer table 0.2 of Executive Summary)	
Lane configuration	2-lane with paved shoulders	
Formation width	**In Open area** 7.0 m of carriageway + 1.5 m Paved shoulder + 1.0 m earthen shoulder **In Built-up area** 7.0 m of carriageway + 2.5 m Paved shoulder + 1.75 m RCC drain	Refer MoRT&H circular dated 17.07.2020
Edge strip	.25m Raised median	
	.5m Depressed Median	
Camber/cross fall	2.5 %	Table 2.7

<table>
<tr><th>Item</th><th>Plain / Rolling / Mountainous Terrain</th><th>Reference</th></tr>
<tr><td>Shoulders</td><td>2.5 % for paved shoulder and 3.0 % for earthen shoulder</td><td>Clause 2.8.2</td></tr>
<tr><td>Side Slope</td><td>1 (V): 2 (H) Fill (Fill height upto 3.0 m)
1 (V): 1.5 (H) Fill (Fill height 3 m to 6.0 m)
1 (V): 0.5 (H) Cut</td><td></td></tr>
<tr><td>Maximum super-elevation</td><td>7.0 %</td><td></td></tr>
<tr><td>Radii of horizontal curves in plain/hilly terrain (m)</td><td><table><tr><th></th><th>Plain</th><th>Hilly</th></tr><tr><td>Ruling Min</td><td>400 m</td><td>150m</td></tr><tr><td>Absolute Min</td><td>250 m</td><td>75m</td></tr></table></td><td>Table 2.5</td></tr>
<tr><td>Drains</td><td>“Rectangular “shape on - either side where warranted depending on Site Condition & U-shaped Drain in hill sections.</td><td></td></tr>
</table>

0.12 Survey & Investigation

0.12.1 Traffic Surveys

Traffic surveys have been conducted at three locations in entire project road length (Teliamura – Harina).

Table 0.6: Traffic count survey locations

Sl. No.	Homogenous Section	Location	Remarks to Capture
1	Section I :: Km 0 to Km 45.0 (Teliamura – Amarpur section)	Km 42.300 (near Rangamati)	Traffic coming from Agartala, Manu bazar & moving towards Amarpur, Harina, Sabroometc (both ways)
2	Section II :: Km 45.0 to Km 88.00 (Amarpur – Ailmara section)	Km 88.000 (near Ailmara)	Traffic coming from Agartala, Manu bazar, Amarpur& moving towards Harina, Sabroom also to Agartala via Harina (both ways)
3	Section III :: Km 88.0 to Km 133.00 (Ailmara – Harina section)	Km 132.800 (near Harina)	Traffic coming from Agartala, Manu bazar, Amarpur& moving towards Harina, Sabroom also to Agartala via Harina (both ways) Inclusion of local traffic.

0.12.2 Growth Rate

The Adopted Traffic Growth rate is taken an average of 5% for all type of vehicles.

0.12.3 AADT, CVPD & Projected Traffic

Table 0.7- Commercial Vehicle Per day

Sl. No.	Location	AADT	PCU	CVPD	Remarks
1	Km 42.30 (near Rangamati)	1579	1583	302	
2	Km 88.00 (near Ailmara)	246	225	35	
3	Km 132.80 (near Harina)	251	241	45	

Projected traffic on the project road is given below:

Table 0.8- Projected traffic

Year	Likely traffic on the Project road			
	PCU at km 42.30(Near Rangamati)	PCU at km 88.00 (Near Ailmara)	PCU at km 132.80 (Near Harina)	Requirement of
2017	1583	224	241	2 Lane
2020	2162	299	334	
2025	2750	368	423	
2030	3500	451	532	
2035	4457	559	666	
2040	5673	696	854	

As per the projected traffic & MoRT&H circular dated 26th May 2016, requirement for four lane is not qualifying upto year 2040 (For Plain terrain = 10000 PCU per day, for Rolling terrain = 8500 PCU per day & for Mountainous terrain = 6000 PCU per day), However, considering the connectivity of Project road with adjacent towns / NH-08 & development of backward areas/ Religious / Tourist Places, it is proposed to develop the project road as two lane with paved shoulder facility.

0.12.4 Axle load survey

Though CVPD (as per above table) on all three locations are found very less (302, 35 & 45), so the Axle load survey could not carried out and the default values of VDF as per table 4.2 of IRC -37:2018 is considered 1.5 for km 88 & 132.800 and value adopted as 3.9 for km 42.300.

0.12.5 Testing of soil from existing embankment

The soil samples from various locations on the existing embankment have been collected and subjected to laboratory testing for determination of various engineering properties. The CBR is found an average of 8%.

Table 0.9: - Existing Pavement Crust

Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer	*Brick Soling*	*Sub base Course*	
		(mm)	*(mm)*	*(mm)*	
0+000	LHS	40	265	-	305
0+500	RHS	35	205	-	240
1+000	LHS	40	215	-	255
1+500	RHS	50	155	-	205
2+000	LHS	40	210	-	250
2+500	RHS	40	200	-	240
3+000	LHS	50	265	-	315
3+500	RHS	30	245	-	275
4+000	LHS	30	255	-	285
4+500	RHS	45	245	-	290
5+000	LHS	50	210	-	260
5+500	RHS	35	210	-	245
6+000	LHS	45	235	-	280
6+500	RHS	40	210	-	250
7+000	LHS	40	155	-	195
7+500	RHS	30	175	-	205
8+000	LHS	35	180	-	215
8+500	RHS	40	195	-	235
9+000	LHS	35	215	-	250
9+500	RHS	40	275	-	315
10+000	LHS	45	245	-	290
10+500	RHS	40	255	-	295
11+000	LHS	40	150	-	190
11+500	RHS	45	210	-	255
12+000	LHS	50	155	-	205
12+500	RHS	50	175	-	225
13+000	LHS	40	180	-	220
13+500	RHS	50	195	-	245
14+000	LHS	35	215	-	250
14+500	RHS	40	275	-	315
15+000	LHS	35	250	-	285
15+500	RHS	40	245	-	285
16+000	LHS	50	215	-	265
16+500	RHS	40	245	-	285

Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer	*Brick Soling*	*Sub base Course*	
		(mm)	*(mm)*	*(mm)*	
17+000	LHS	40	260	-	300
17+500	RHS	35	280	-	315
18+000	LHS	35	195	-	230
18+500	RHS	35	220	-	255
19+000	LHS	40	180	-	220
19+500	RHS	45	250	-	295
20+000	LHS	35	275	-	310
20+500	RHS	45	170	-	215
21+000	LHS	35	165	-	200
21+500	RHS	30	195	-	225
22+000	LHS	50	165	-	215
22+500	RHS	50	180	-	230
23+000	LHS	40	195	-	235
23+500	RHS	35	215	-	250
24+000	LHS	40	275	-	315
24+500	RHS	45	245	-	290
25+000	LHS	35	255	-	290
25+500	RHS	40	150	-	190
26+000	LHS	45	150	-	195
26+500	RHS	45	180	-	225
27+000	LHS	45	180	-	225
27+500	RHS	40	155	-	195
28+000	LHS	30	160	-	190
28+500	RHS	45	165	-	210
29+000	LHS	45	195	-	240
29+500	RHS	30	250	-	280
30+000	LHS	35	200	-	235
30+500	RHS	35	225	-	260
31+000	LHS	35	255	-	290
31+500	RHS	35	260	-	295
32+000	LHS	40	230	-	270
32+500	RHS	45	245	-	290
33+000	LHS	50	220	-	270
33+500	RHS	30	195	-	225
34+000	LHS	45	265	-	310

Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer	*Brick Soling*	*Sub base Course*	
		(mm)	*(mm)*	*(mm)*	
34+500	RHS	40	255	-	295
35+000	LHS	45	245	-	290
35+500	RHS	50	200	-	250
36+000	LHS	50	240	-	290
36+500	RHS	40	225	-	265
37+000	LHS	50	215	-	265
37+500	RHS	35	150	-	185
38+000	LHS	40	200	-	240
38+500	RHS	35	170	-	205
39+000	LHS	40	180	-	220
39+500	RHS	50	215	-	265
40+000	LHS	40	275	-	315
40+500	RHS	40	255	-	295
41+000	LHS	50	250	-	300
41+500	RHS	30	200	-	230
42+000	LHS	50	170	-	220

0.12.6 CBR Test Results of soil samples

NORTH EAST SOIL TESTING (NEST)

Regd. Office : Ujan Abhoynagar,
Opp. Post Office, Agartala ,
West Tripura, PIN – 799005 ,

ISO 9001:2008 Certified

Issue Date : 25.03.17
Issued To : TASPL
Sample Deposited by : Representative
Sample Description : Soil

Job No. : B 5533
Date of Sample received : 20.02.17
Page :3.of..3....

Location: - Teliamura - Sabroom Section

Sl.No.	Chainage No. (Km)	MDD (g/cc)	OMC (%)	Unsoaked CBR (%)	Soaked CBR (%)	Swelling Index (%)
01	10.00	1.756	15.71	15.43	7.54	3.86
02	20.00	1.878	11.55	18.86	8.14	2.65
03	30.00	1.782	15.26	16.52	7.86	3.79
04	55.00	1.794	14.78	17.47	7.98	3.79
05	65.00	1.802	13.92	18.58	8.04	2.98
06	75.00	1.816	14.11	18.61	8.12	2.78
07	95.00	1.823	13.75	17.94	7.96	2.71
08	105.00	1.787	15.78	16.76	7.89	3.73
09	115.00	1.796	14.74	17.33	7.85	3.81
10	Borrow Area Near Km 44.00	1.778	15.55	17.27	8.43	3.77
11	Borrow Area Near Km 82.00	1.800	13.76	17.78	8.16	3.02

Prepared by
25/03/17
B. Tech (Civil)
Quality Manager,
North East Soil Testing,
Agartala-799005

(1) This test report pertains only to the sample tested. (2) This test report is valid at the time of and under the conditions specified here in. (3) Any correction invalidates this test report. This test report should not be published in part or in full by any body without written permission from 'NEST'. (4) Samples will be destroyed after 90 days from the date of reporting unless otherwise specified. (5) This report not to be reproduced wholly or in part & can not be used as an evidence in the court of Law & should not be used in any advertising media without our special permission in writing.

0.13 Material survey

Aggregate quarry for structure works and road works is identified at Silchar (Assam) which is Approx 300km away from Teliamura.

Sand source has been located from Local River with average lead of 20 km.

Borrow earth can be obtained from number of locations along the project road.

Cement for concrete works may purchase from local vendors of different grades of OPC & PPC.

Steel for concrete work may also use from local suppliers.

Bitumen supply is considered from Guwahati depot (For packed bitumen) with lead of approx. 510Km. the rate of bitumen has been provided at Agartala with price of Rs 42000/- per MT + 18% GST, at Teliamura site it will be Rs 41000/- per MT +18% GST (a quotation is shown here)

Swastik Petrochem
Factory: Vill. Bheleuguri,
Samaguri, Nagaon, Assam – 782003
Mob.: +91-98120-39009
e-mail: petro.swastik@gmail.com

Ref:- SP/Q-108/2020-21 Dated: 06.01.2020

To,
M/s.Technocraft Advisory Services Pvt Ltd,
Ghaziabad,

Plant at :-Teliamura Tripura

Sub.: Offer for Sale of Bitumen VG-30 and Bitumen VG-40 (Packed in Drums)

Dear Sir,

This is with reference to your requirement of Bitumen and telephonic conversation had with you. We are pleased to offer our competitive rates for sale of Bitumen VG-30 and Bitumen VG-40 (Packed in Drums) as under:-

Sr. No.	Description	Quantity	Rates (in Rs.)
1	Bitumen VG-30 (Packed in Drums) HS Code : 27132000	1000 M.T. (Approx)	41000/- per M.T. + 18% GST
2	Bitumen VG-40 (Packed in Drums) HS Code : 27132000	1000 M.T. (Approx)	42000/- per M.T. + 18% GST

Note:-

1. These rates are F.O.R at Agartala.
2. Payment 100% advance before dispatch of Material.
3. GST @18% will be charged.
4. This offer is valid for 7 days.

Thanking you,
For Swastik Petrochem

Amit Monga
Mob. No : 80530-52130

0.14 Geotechnical Investigations

Geotechnical investigations have been completed and the results shown in other volume "Material Report".

0.15 Development Proposals

0.15.1 Pavement Design

Considering a growth rate of 5 % and VDF as 1.5 & 3.9 obtained from the IRC, design of pavement as per IRC 37 -2018 for a design life of minimum 15 years.

Accordingly design traffic has been worked out as 20MSA (as per 5.4.1 (i) of Two lane manual, IRC SP: 73: 2018) and considering sub-grade construction with soil of CBR not less than 8%,
The Pavement compositions for Project road as per IRC 37-2018 is as under:

a) Bituminous concrete (BC) - 40mm,
b) Bituminous stabilized material - 100mm,
c) Cement treated sub base - 200mm &
d) Subgrade - 500mm

0.15.2 Typical Cross Section and Widening Scheme

i) **Roadway width -**

a. **For Plain areas -** Roadway width of 12.00 (7.0+2x1.5+2x1.0) is proposed for sections with 2 lane plus paved shoulders of 1.50m and unpaved shoulder of 1.00m on either side in plain areas and,

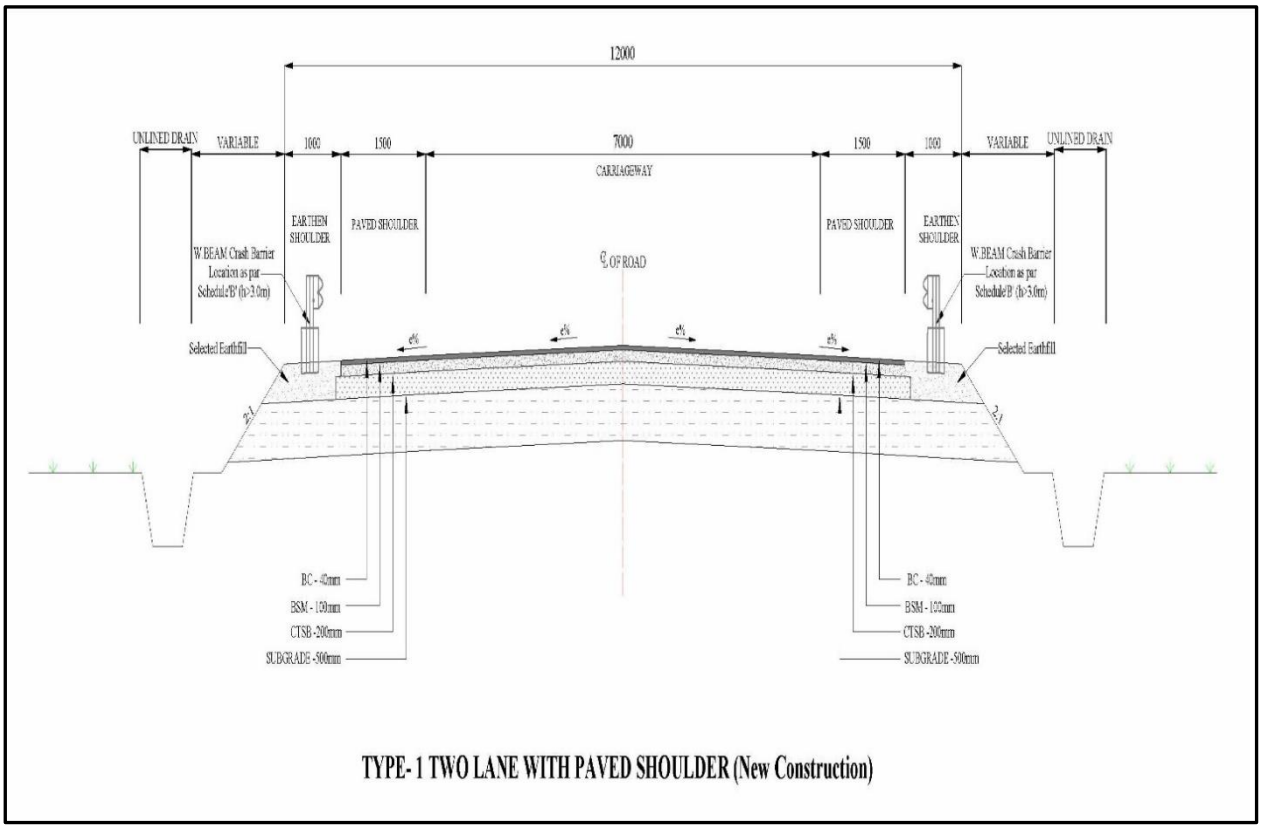
b. **For Built-up areas -** Roadway width of 12.00 (7.0+2x2.5 paved shoulder) + (2x1.75 drain) is proposed for sections with 2 lane plus paved shoulders of 1.50m and RCC covered drain of 1m wide on either side of Road way,

c. **For Hilly areas -** Roadway width of 10.00 (7.0+2x1.5) is proposed for sections with 2 lane plus paved shoulders of 1.50m (as per attached cross sections),

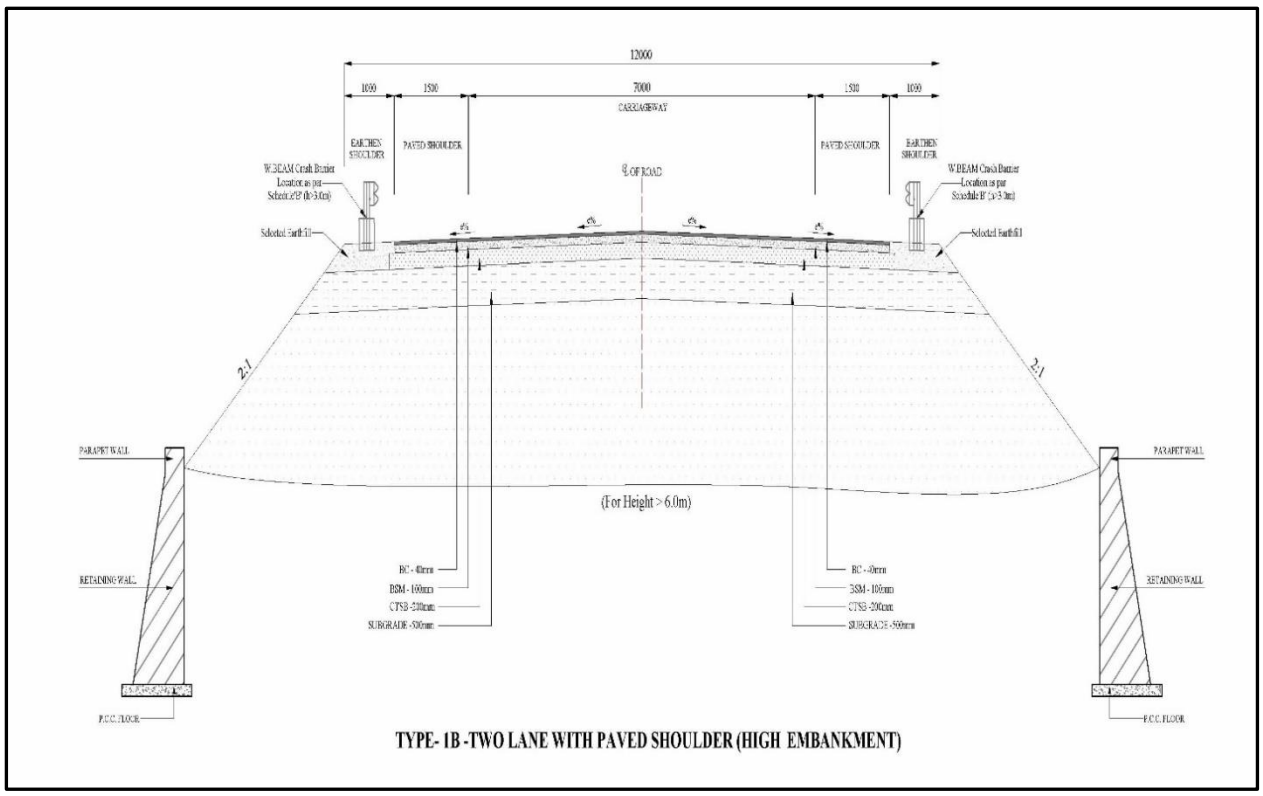
ii) **Carriageway Width -** Two Lane Carriage way (3.5m for each lane) is proposed,

iii) **Shoulders -** Unpaved shoulders of 1.0 wide and paved shoulder of 1.50m are proposed on either side of the Carriage way.

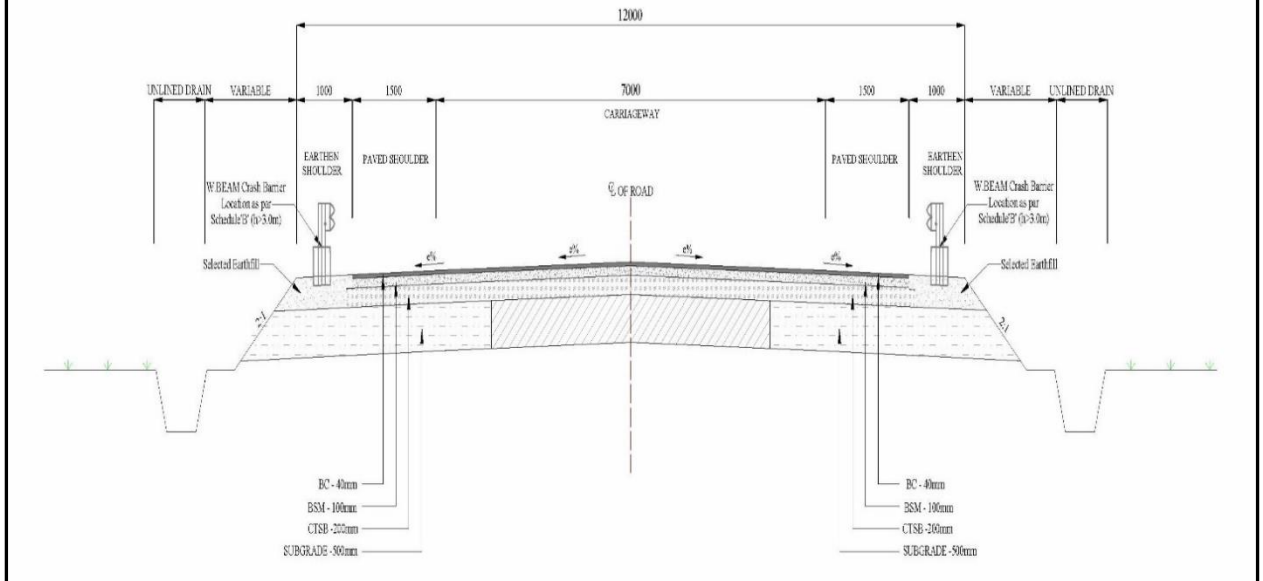
Proposed Typical cross sections are shown here –



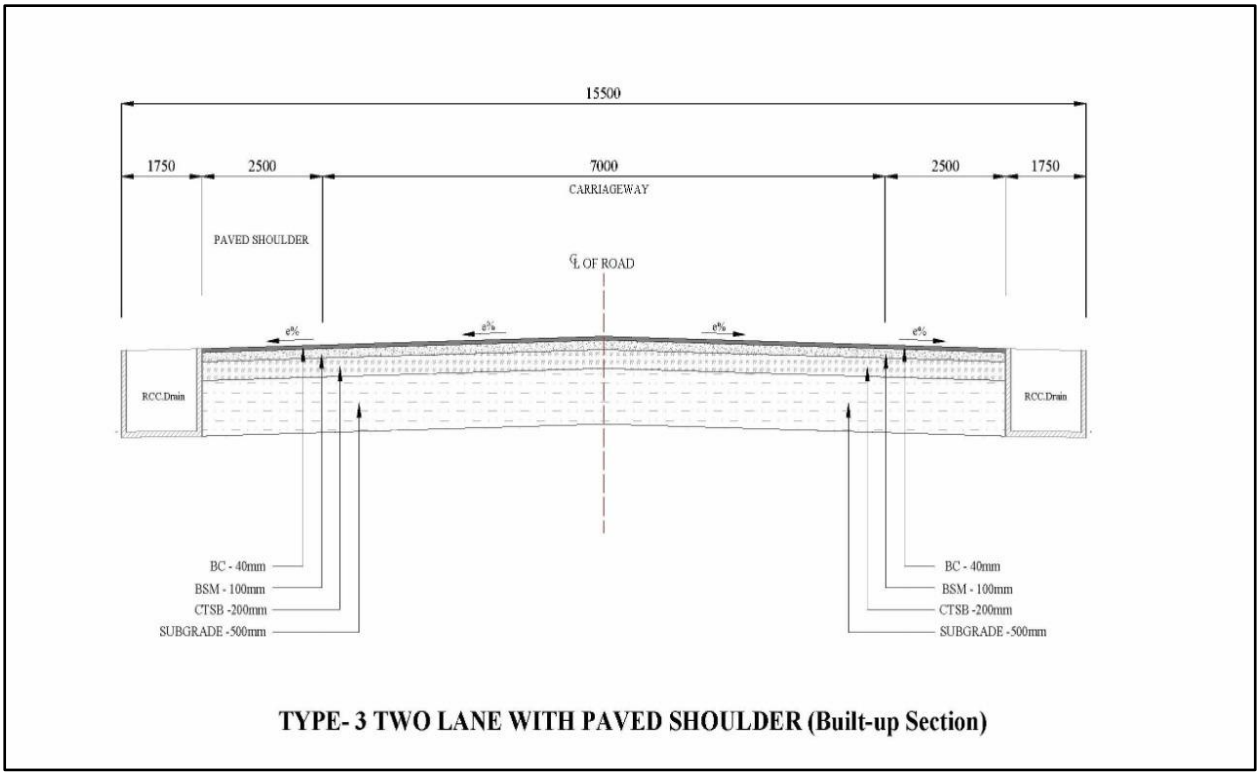
TYPE- 1 TWO LANE WITH PAVED SHOULDER (New Construction)



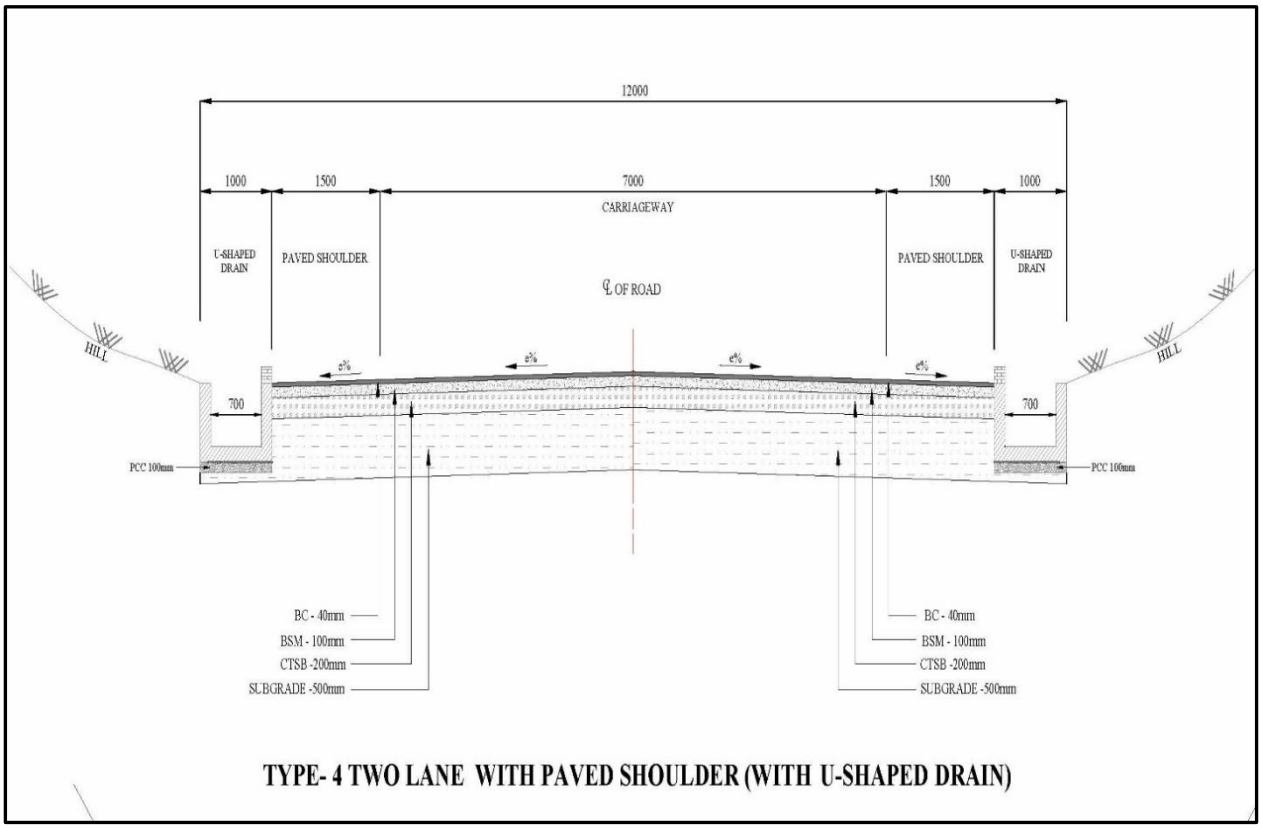
TYPE- 1B -TWO LANE WITH PAVED SHOULDER (HIGH EMBANKMENT)



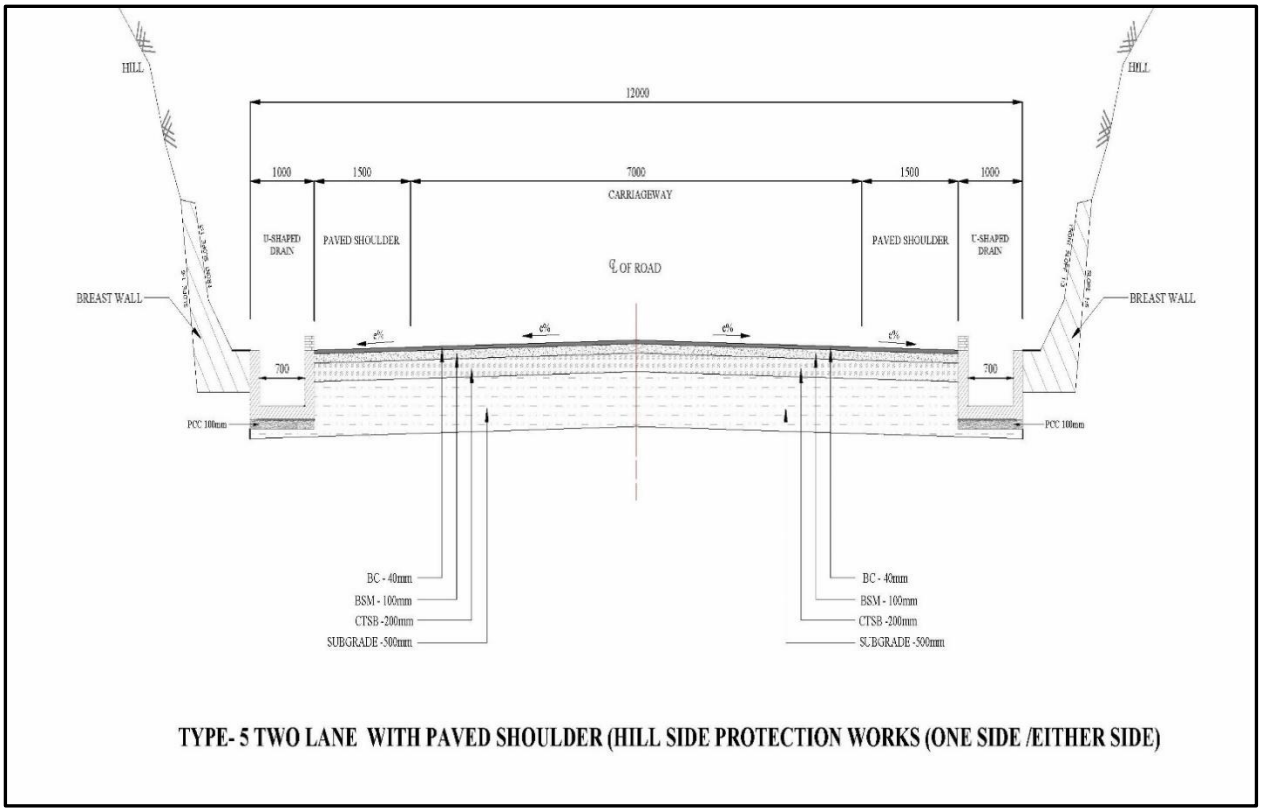
TYPE- 2 TWO LANE WITH PAVED SHOULDER (PARTIALLY EXISTING / NEW ALIGNMENT)



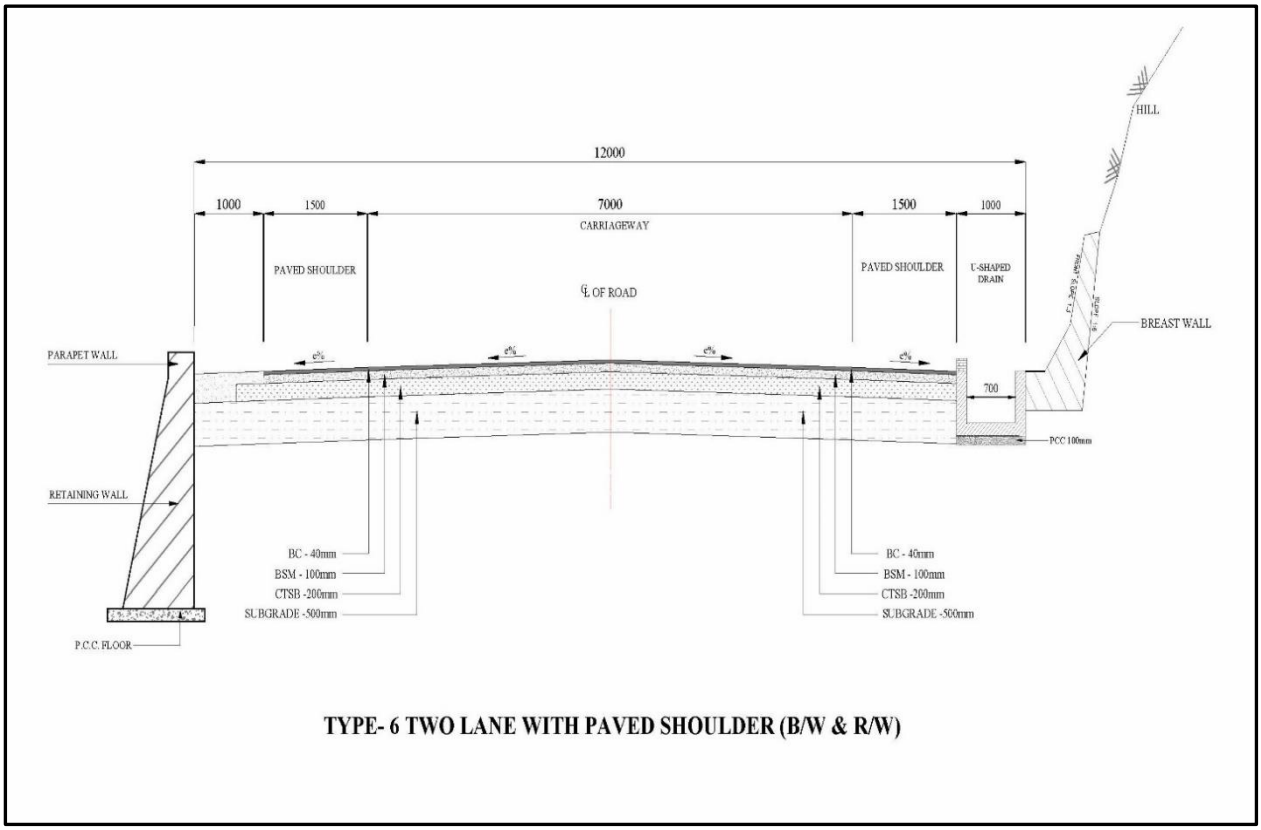
TYPE- 3 TWO LANE WITH PAVED SHOULDER (Built-up Section)



TYPE- 4 TWO LANE WITH PAVED SHOULDER (WITH U-SHAPED DRAIN)



TYPE- 5 TWO LANE WITH PAVED SHOULDER (HILL SIDE PROTECTION WORKS (ONE SIDE /EITHER SIDE)



TYPE- 6 TWO LANE WITH PAVED SHOULDER (B/W & R/W)

TCS Schedule –

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
1	127+319	128+559		1+240		Overlay of Exis road & widenning to 2L+PS	NH-8
1	0+000	1+300		1+300	TCS-1	Two Lane With Paved Shoulder (New Construction)	Teliamura Bypass
2	1+300	2+600		1+300	TCS-2	Two Lane With Paved Shoulder	(New Construction / over existing road)
3	2+600	3+100		0+500	TCS-3	Two lane with paved shoulder (Built-up section)	New Construction
4	3+100	5+000		1+900	TCS-2	Two Lane With Paved Shoulder	(New Construction / over existing road)
5	5+000	5+300		0+300	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
6	5+300	5+640		0+340	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
7	5+640	5+960		0+320	TCS-6	Two Lane With Paved Shoulder in hill (BW & RW)	
8	5+960	7+300		1+340	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
9	7+300	7+560		0+260	TCS-6	Two Lane With Paved Shoulder in hill (BW & RW)	
10	7+560	7+980		0+420	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
11	7+980	8+120		0+140	TCS-1	Two Lane With Paved Shoulder (High embankment)	
12	8+120	8+400		0+280	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
13	8+400	8+520		0+120	TCS-1	Two Lane With Paved Shoulder (High embankment)	
14	8+520	9+200		0+680	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
15	9+200	9+240		0+040	TCS-1	Two Lane With Paved Shoulder (High embankment)	
16	9+240	11+080		1+840	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
17	11+080	11+140		0+060	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
18	11+140	11+400		0+260	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
19	11+400	11+640		0+240	TCS-1	Two Lane With Paved Shoulder (High embankment)	
20	11+640	11+760		0+120	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
21	11+760	12+920	50	1+110	TCS-1	Two Lane With Paved Shoulder (New Construction)	Twidu Bypass
22	12+920	13+250		0+330	TCS-3	Two lane with paved shoulder (Built-up section)	New Construction
23	13+250	13+500		0+250	TCS-1	Two Lane With Paved Shoulder (New Construction)	
24	13+500	14+480		0+980	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
25	14+480	14+520		0+040	TCS-1	Two Lane With Paved Shoulder (High	

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
						embankment)	
26	14+520	14+700		0+180	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
27	14+700	15+600		0+900	TCS-2	Two Lane With Paved Shoulder	(New Construction / over existing road)
28	15+600	15+940		0+340	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
29	15+940	16+300		0+360	TCS-1	Two Lane With Paved Shoulder (New Construction)	
30	16+300	16+440		0+140	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
31	16+440	16+540		0+100	TCS-1	Two Lane With Paved Shoulder (New Construction)	
32	16+540	16+620		0+080	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
33	16+620	16+880		0+260	TCS-1	Two Lane With Paved Shoulder (New Construction)	
34	16+880	16+980		0+100	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
35	16+980	17+200		0+220	TCS-1	Two Lane With Paved Shoulder (New Construction)	
36	17+200	17+400		0+200	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
37	17+400	17+940	26	0+514	TCS-1	Two Lane With Paved Shoulder (New Construction)	Ompinagar Bypass

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
38	17+940	18+000		0+060	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	Ompinagar Bypass
1	18+000	18+160		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
2	18+160	18+300		0+140	TCS-1	Two Lane With Paved Shoulder (New Construction)	
3	18+300	18+540		0+240	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
4	18+540	19+020	40	0+440	TCS-1	Two Lane With Paved Shoulder (New Construction)	
5	19+020	19+500		0+480	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
6	19+500	19+600		0+100	TCS-1	Two Lane With Paved Shoulder (New Construction)	
7	19+600	19+640		0+040	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
8	19+640	19+820	16	0+164	TCS-1	Two Lane With Paved Shoulder (New Construction)	
9	19+820	20+020		0+200	TCS-2	Two Lane With Paved Shoulder	
10	20+020	20+440		0+420	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
11	20+440	20+700		0+260	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
12	20+700	21+080		0+380	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
13	21+080	22+400	21	1+299	TCS-1	Two Lane With Paved Shoulder (New Construction)	
14	22+400	22+720		0+320	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
15	22+720	22+940		0+220	TCS-2	Two Lane With Paved Shoulder	
16	22+940	23+100		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
17	23+100	23+300		0+200	TCS-3	Two lane with paved shoulder (Built-up section)	
18	23+300	26+080	129	2+651	TCS-2	Two Lane With Paved Shoulder	
19	26+080	26+260		0+180	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
20	26+260	26+480		0+220	TCS-1	Two Lane With Paved Shoulder (New Construction)	
21	26+480	26+640		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
22	26+640	26+760		0+120	TCS-2	Two Lane With Paved Shoulder	
23	26+760	27+040		0+280	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
24	27+040	28+000		0+960	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
25	28+000	28+840		0+840	TCS-2	Two Lane With Paved Shoulder	
26	28+840	29+320		0+480	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
27	29+320	29+620	20	0+280	TCS-1	Two Lane With Paved Shoulder (New	

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
						Construction)	
28	29+620	29+880		0+260	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
29	29+880	30+440		0+560	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
30	30+440	30+600		0+160	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
31	30+600	31+440	50	0+790	TCS-2	Two Lane With Paved Shoulder	
32	31+440	31+600		0+160	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
33	31+600	32+140		0+540	TCS-2	Two Lane With Paved Shoulder	
34	32+140	32+240		0+100	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
35	32+240	32+540		0+300	TCS-4	Two Lane With Paved Shoulder (b/s PCC drain)	
36	32+540	32+620		0+080	TCS-5	Two Lane With Paved Shoulder in hill B/s Breast wall	
37	32+620	33+500	20	0+860	TCS-1	Two Lane With Paved Shoulder (New Construction)	
38	33+500	34+140		0+640	TCS-2	Two Lane With Paved Shoulder	
39	34+140	36+000	20	1+840	TCS-1	Two Lane With Paved Shoulder (New Construction) with high embankment also	
	Total Length..		**392**	**36+848**			

Sl. No	Design Chainage (Km)		Bridge Length (m)	Total length	TCS Type	Description	
	From	To					
				10+037	**TCS-1**	Two Lane With Paved Shoulder (New Construction)	
				10+101	**TCS-2**	Two Lane With Paved Shoulder	(New Construction / over existing road)
				1+030	**TCS-3**	Two lane with paved shoulder (Built-up section)	
				9+000	**TCS-4**	Two Lane With Paved Shoulder (b/s PCC drain)	
				4+860	**TCS-5**	Two Lane With Paved Shoulder in hill B/s Breast wall	
				0+580	**TCS-6**	Two Lane With Paved Shoulder in hill (BW & RW)	

0.16 Horizontal Design of Project road

The horizontal alignment design report is tabulated below.

Table 0.10: Horizontal Report

Curve No.	HORIZONTAL CURVE				Terrain	Transition length	Speed (Kmph)
	Start Chainage	End Chainage	Radius	Direction			
1	0+128.086	0+205.912	400	Left	Plain	55	80
2	0+433.205	0+682.957	1200	Right	Plain	40	100
3	1+131.499	1+283.198	600	Right	Plain	80	100
4	1+743.398	1+908.526	1000	Left	Plain	50	100
5	2+235.648	2+257.802	400	Right	Plain	55	80
6	2+431.839	2+580.394	400	Left	Plain	55	80
7	2+809.236	3+139.451	250	Right	Plain	90	80
8	3+322.725	3+430.000	250	Left	Plain	90	80
9	4+003.594	4+096.964	250	Right	Plain	90	80
10	4+286.669	4+343.121	250	Left	Plain	90	80
11	4+650.413	4+774.182	800	Left	Plain	60	100
12	4+864.513	4+898.943	75	Right	Hilly	30	40
13	4+962.896	5+055.261	75	Left	Hilly	30	40
14	5+100.585	5+180.576	125	Right	Hilly	15	40
15	5+601.467	5+633.513	150	Left	Hilly	30	50
16	5+792.491	5+857.362	150	Right	Hilly	30	50
17	6+148.640	6+298.224	400	Left	Hilly	20	50
18	6+564.172	6+621.263	300	Right	Hilly	20	50
19	6+752.470	6+762.095	80	Left	Hilly	25	40
20	7+187.308	7+245.170	80	Right	Hilly	25	40
21	7+352.445	7+453.507	80	Left	Hilly	25	40
22	7+574.174	7+704.397	150	Right	Hilly	30	50
23	8+224.601	8+289.136	80	Left	Hilly	25	40
24	8+386.405	8+483.546	80	Right	Hilly	25	40
25	8+657.817	8+724.588	150	Left	Hilly	30	50
26	8+818.535	8+843.044	80	Right	Hilly	25	40
27	8+993.503	9+000.546	80	Left	Hilly	25	40
28	9+150.319	9+196.192	400	Right	Hilly	15	50
29	9+318.788	9+375.761	80	Left	Hilly	25	40
30	9+427.185	9+519.628	80	Right	Hilly	25	40
31	9+814.680	9+884.201	100	Left	Hilly	45	50
32	10+009.567	10+108.445	100	Right	Hilly	45	50
33	10+226.354	10+412.962	150	Left	Hilly	40	65
34	10+553.468	10+632.576	100	Right	Hilly	55	65
35	10+804.968	10+889.615	100	Left	Hilly	55	65
36	11+015.830	11+070.469	80	Right	Hilly	25	40
37	11+147.641	11+362.103	400	Left	Hilly	10	50
38	11+471.509	11+922.610	400	Right	Plain	55	80
39	12+210.174	12+670.920	500	Left	Plain	45	80

Curve No.	HORIZONTAL CURVE				Terrain	Transition length	Speed (Kmph)
	Start Chainage	End Chainage	Radius	Direction			
40	13+003.099	13+181.651	300	Left	Plain	75	80
41	13+315.420	13+514.360	400	Right	Plain	55	80
42	13+666.485	13+795.537	300	Left	Hilly	20	50
43	13+904.228	13+971.719	100	Right	Hilly	55	65
44	14+168.854	14+537.441	350	Left	Hilly	0	50
45	14+645.987	14+686.558	100	Right	Hilly	55	65
46	15+077.388	15+174.397	400	Right	Plain	55	80
47	15+523.837	15+792.000	400	Left	Plain	55	80
48	16+530.876	16+640.865	1500	Left	Plain	35	100
49	18+649.419	18+919.581	2000	Right	Plain	0	100
50	19+845.083	19+938.149	1500	Left	Plain	35	100
51	20+461.921	20+552.901	500	Right	Plain	95	100
52	21+233.044	21+491.875	1500	Left	Plain	35	100
53	21+996.937	22+099.469	800	Left	Plain	60	100
54	22+422.304	22+506.644	400	Right	Plain	55	80
55	22+875.158	22+931.998	600	Left	Plain	80	100
56	23+191.597	23+372.718	500	Left	Plain	45	80
57	23+517.098	23+786.390	400	Right	Plain	55	80
58	23+887.009	23+993.539	500	Left	Plain	45	80
59	24+142.792	24+204.609	500	Left	Plain	45	80
60	24+916.613	24+979.818	2000	Left	Plain	0	100
61	25+371.802	25+621.120	400	Left	Plain	55	80
62	25+922.365	26+448.239	500	Right	Plain	95	100
63	26+867.119	26+957.755	400	Left	Plain	115	100
64	27+127.902	27+296.957	400	Right	Plain	55	80
65	27+532.613	27+631.683	400	Left	Plain	55	80
66	27+870.498	28+226.987	700	Right	Plain	70	100
67	28+973.342	29+658.832	700	Left	Plain	35	80
68	30+053.737	30+324.691	400	Right	Plain	55	80
69	30+637.502	30+832.549	600	Left	Plain	80	100
70	31+016.950	31+206.575	600	Right	Plain	35	80
71	31+328.308	31+950.224	600	Left	Plain	35	80
72	32+057.708	32+458.243	400	Right	Plain	55	80
73	32+693.755	32+917.288	400	Left	Plain	55	80
74	33+773.513	33+950.019	600	Left	Plain	80	100
75	34+213.933	34+319.238	600	Right	Plain	80	100
76	34+655.841	35+212.712	600	Left	Plain	80	100

Table 0.11: Deviation in Horizontal curves

Curve No.	HORIZONTAL CURVE				Terrain	Transition Length (m)	Speed	Reason of Deviation
	Start Chainage (Km)	End Chainage (Km)	Radius	Direction			(Kmph)	
Nil								

0.17 Vertical Design of Project road

Vertical design report is tabulated below.

Table 0.12: Vertical Report

PVI	PVI		Curve Length (m)	Gradient (%)		Chainage (m)		Level (m)		Type Of Curve	K Value
No	Design Chainage (km)	Level (m)		IN	OUT	Start of Curve (km)	End of Curve (km)	Start of Curve (m)	End of Curve (m)		
1	0+500.529	50.583	200	0.367	2.406	0+400.529	0+600.529	50.216	52.989	Sag	98.105
2	1+591.364	76.825	475	2.406	-1.943	1+353.864	1+828.864	71.111	72.209	Hog	109.226
3	2+154.383	65.884	250	-1.943	1.097	2+029.383	2+279.383	68.313	67.256	Sag	82.229
4	4+540.483	92.063	500	1.097	-0.635	4+290.483	4+790.483	89.32	90.475	Hog	288.657
5	5+812.726	83.984	300	-0.635	2.846	5+662.726	5+962.726	84.937	88.252	Sag	86.192
6	6+771.396	111.264	500	2.846	-4.351	6+521.396	7+021.396	104.15	100.387	Hog	69.479
7	7+565.569	76.711	250	-4.351	3.842	7+440.569	7+690.569	82.149	81.513	Sag	30.513
8	8+323.279	105.824	250	3.842	-0.357	8+198.279	8+448.279	101.021	105.378	Hog	59.536
9	9+490.000	101.661	300	-0.357	-0.702	9+340.000	9+640.000	102.196	100.608	Hog	869.1
10	10+742.699	92.867	400	-0.702	-1.864	10+542.699	10+942.699	94.271	89.139	Hog	344.231
11	11+420.000	80.242	300	-1.864	-3.76	11+270.000	11+570.000	83.038	74.602	Hog	158.216
12	12+060.000	56.177	300	-3.76	0.351	11+910.000	12+210.000	61.817	56.703	Sag	72.977
13	13+010.208	59.51	400	0.351	3.95	12+810.208	13+210.208	58.808	67.409	Sag	111.139
14	13+885.008	94.063	400	3.95	-1.22	13+685.008	14+085.008	86.163	91.622	Hog	77.365
15	14+928.187	81.331	400	-1.22	-4.754	14+728.187	15+128.187	83.772	71.823	Hog	113.205
16	15+444.836	56.77	300	-4.754	2.266	15+294.836	15+594.836	63.901	60.168	Sag	42.738
17	16+090.240	71.392	200	2.266	0.935	15+990.240	16+190.240	69.126	72.327	Hog	150.281
18	16+900.000	78.961	650	0.935	-3.343	16+575.000	17+225.000	75.923	68.097	Hog	151.959
19	17+678.041	52.953	150	-3.343	-0.334	17+603.041	17+753.041	55.46	52.703	Sag	49.848
20	19+060.331	48.342	200	-0.334	2.826	18+960.331	19+160.331	48.676	51.168	Sag	63.299
21	19+554.839	62.317	350	2.826	0.337	19+379.839	19+729.839	57.371	62.906	Hog	140.59
22	20+407.818	65.19	400	0.337	-1.548	20+207.818	20+607.818	64.516	62.095	Hog	212.249
23	21+120.000	54.168	100	-1.548	-0.425	21+070.000	21+170.000	54.942	53.956	Sag	89.061
24	21+549.132	52.345	100	-0.425	1.461	21+499.132	21+599.132	52.557	53.076	Sag	53.014
25	21+989.505	58.781	300	1.461	-0.42	21+839.505	22+139.505	56.589	58.151	Hog	159.423
26	22+792.276	55.407	400	-0.42	-1.615	22+592.276	22+992.276	56.248	52.176	Hog	334.728
27	23+473.700	44.4	250	-1.615	0.406	23+348.700	23+598.700	46.419	44.907	Sag	123.692
28	24+410.000	48.2	500	0.406	-0.296	24+160.000	24+660.000	47.185	47.461	Hog	712.81
29	25+500.000	44.978	150	-0.296	1.856	25+425.000	25+575.000	45.2	46.37	Sag	69.703
30	26+175.392	57.516	425	1.856	-1.014	25+962.892	26+387.892	53.571	55.36	Hog	148.042
31	26+640.000	52.803	150	-1.014	1.248	26+565.000	26+715.000	53.564	53.739	Sag	66.305
32	27+349.922	61.662	500	1.248	-1.172	27+099.922	27+599.922	58.542	58.733	Hog	206.643

PVI	PVI		Curve Length (m)	Gradient (%)		Chainage (m)		Level (m)		Type Of Curve	K Value
No	Design Chainage (km)	Level (m)		IN	OUT	Start of Curve (km)	End of Curve (km)	Start of Curve (m)	End of Curve (m)		
33	28+560.000	47.483	250	-1.172	0.372	28+435.000	28+685.000	48.948	47.948	Sag	161.977
34	29+180.000	49.787	400	0.372	-0.799	28+980.000	29+380.000	49.044	48.19	Hog	341.79
35	30+718.569	37.499	400	-0.799	0.382	30+518.569	30+918.569	39.097	38.263	Sag	338.702
36	31+430.000	40.217	400	0.382	-0.341	31+230.000	31+630.000	39.453	39.535	Hog	553.127
37	33+149.469	34.353	200	-0.341	0.326	33+049.469	33+249.469	34.694	34.679	Sag	299.606
38	35+363.602	41.581	300	0.326	-0.393	35+213.602	35+513.602	41.092	40.992	Hog	417.009

0.18 Extra Width on Curves

Details of Extra width area & Road Delineators

Table 0.13: Extra width on curves

Sl. No.	HORIZONTAL CURVE					Terrain	Transition length (m)	Extra width (m)	Surfeace Area		Road Delineators	
	Start Chainage (km)	End Chainage (km)	Length of curve (m)	Radius (m)	Direction				Curve surface	Taper surface	Spacing	Numbers
1	2824.288	3054.713	230.425	150	Right	Plain	30	0.6	138.26	18.00	12	20
2	4011.147	4104.363	93.216	250	Right	Plain	90	0.6	55.93	54.00	20	5
3	4294.157	4350.609	56.452	250	Left	Plain	90	0.6	33.87	54.00	20	3
4	4872.000	4906.43	34.43	75	Right	Hill	30	0.9	30.99	27.00	8	5
5	4970.383	5062.749	92.366	75	Left	Hill	30	0.9	83.13	27.00	8	12
6	5108.072	5188.064	79.992	125	Right	Hill	15	0.6	48.00	9.00	12	7
7	5608.954	5641.001	32.047	150	Left	Hill	30	0.6	19.23	18.00	12	3
8	5799.979	5864.85	64.871	150	Right	Hill	30	0.6	38.92	18.00	12	6
9	6571.660	6628.751	57.091	300	Right	Hill	20	0.6	34.25	12.00	25	3
10	6759.957	6769.582	9.625	80	Left	Hill	25	0.9	8.66	22.50	8	2
11	7194.796	7252.657	57.861	80	Right	Hill	25	0.9	52.07	22.50	8	8
12	7359.932	7460.994	101.062	80	Left	Hill	25	0.9	90.96	22.50	8	13
13	7581.661	7711.885	130.224	150	Right	Hill	30	0.6	78.13	18.00	12	11
14	8232.089	8296.623	64.534	80	Left	Hill	25	0.9	58.08	22.50	8	9
15	8393.893	8491.034	97.141	80	Right	Hill	25	0.9	87.43	22.50	8	13
16	8665.305	8732.076	66.771	150	Left	Hill	30	0.6	40.06	18.00	12	6
17	8826.022	8850.531	24.509	80	Right	Hill	25	0.9	22.06	22.50	8	4
18	9000.991	9008.033	7.042	80	Left	Hill	25	0.9	6.34	22.50	8	1

Details of Extra width area & Road Delineators

Table 0.13: Extra width on curves

Sl. No.	HORIZONTAL CURVE					Terrain	Transition length (m)	Extra width (m)	Surface Area		Road Delineators	
	Start Chainage (km)	End Chainage (km)	Length of curve (m)	Radius (m)	Direction				Curve surface	Taper surface	Spacing	Numbers
19	9326.276	9383.248	56.972	80	Left	Hill	25	0.9	51.27	22.50	8	8
20	9434.672	9527.116	92.444	80	Right	Hill	25	0.9	83.20	22.50	8	12
21	9822.168	9891.689	69.521	100	Left	Hill	45	0.9	62.57	40.50	12	6
22	10017.055	10115.932	98.877	100	Right	Hill	45	0.9	88.99	40.50	12	9
23	10233.841	10420.449	186.608	150	Left	Hill	40	0.6	111.96	24.00	12	16
24	10560.956	10640.064	79.108	100	Right	Hill	55	0.9	71.20	49.50	12	7
25	10812.456	10897.103	84.647	100	Left	Hill	55	0.9	76.18	49.50	12	8
26	11023.317	11077.957	54.64	80	Right	Hill	25	0.9	49.18	22.50	8	7
27	13010.587	13189.139	178.552	300	Left	Hill	75	0.6	107.13	45.00	25	8
28	13673.972	13803.024	129.052	300	Left	Plain	20	0.6	77.43	12.00	25	6
29	13911.715	13979.207	67.492	100	Right	Hill	55	0.9	60.74	49.50	12	6
30	14653.475	14694.046	40.571	100	Right	Hill	55	0.9	36.51	49.50	12	4
									1802.74	858.000		**228**
									2660.74			

0.19 Sight Distance

Table 0.14: Sight Distance

PVI No.	PVI Design Chainage (km)	PVI Level (m)	Curve Length	Type of Curve	K Value	Safe stopping Sight Distance	Speed
1	501	50.583	200	Sag	98.105		
2	1550	76.825	600	Hog	137.969	246.304	
3	2154	65.884	250	Sag	82.229		
4	4540	92.063	500	Hog	288.657	356.264	
5	5813	83.984	300	Sag	86.192		
6	6771	111.264	500	Hog	69.479	174.787	
7	7566	76.711	250	Sag	30.513		
8	8323	105.824	250	Hog	59.536	161.797	
9	9490	101.661	300	Hog	869.1	786.914	
10	10743	92.867	400	Hog	344.231	389.05	
11	11420	80.242	300	Hog	158.216	263.758	
12	12060	56.177	300	Sag	73.306		
13	13204	59.977	400	Sag	85.642		
14	13885	94.063	400	Hog	64.274	168.112	
15	14928	81.331	400	Hog	113.205	223.108	
16	15445	56.77	300	Sag	42.738		
17	16090	71.392	300	Hog	150.281	257.06	
18	16957	74.021	500	Hog	118.718	228.476	
19	17641	47.279	200	Sag	45.041		
20	18270	50.627	250	Hog	268.314	360.959	
21	19053	47.5	300	Sag	79.917		
22	19481	61.872	300	Hog	156.299	262.156	
23	20181	71.916	400	Hog	111.021	220.945	
24	21130	51.34	300	Sag	119.771		
25	21640	53.058	200	Sag	153.776		
26	21990	58.781	300	Hog	145.79	253.189	
27	22792	55.407	400	Hog	378.582	408.081	
28	23473	45.352	250	Sag	147.336		
29	24361	47.304	400	Hog	580.147	518.867	
30	25146	43.615	250	Sag	228.017		
31	25563	46.228	300	Sag	246.62		
32	26175	57.516	425	Hog	148.72	255.721	
33	26640	52.803	150	Sag	66.305		
34	27350	61.662	500	Hog	214.396	307.036	
35	28355	50.761	250	Sag	345.986		
36	30602	42.633	200	Hog	164.362	280.678	
37	30900	37.931	80	Sag	40.723		

PVI	PVI		Curve	Type of	K Value	Safe stopping Sight Distance	Speed
No.	Design Chainage (km)	Level (m)	Length	Curve			
38	31297	39.463	200	Hog	337.71	471.233	
39	32417	37.15	500	Hog	1491.37	905.764	
40	33360	32.037	300	Sag	349.539		
41	35800	39.756	150	Hog	208.533	380.644	

0.20 Road Junctions/ Intersections

The details of cross roads/ junction development is as under -

Table 0.15: Improvement proposal at the intersection

Sl. No.	Section	Existing Junctions	Proposals
1	Section I km 0.0 to km 36.0	126 Junctions (01 Major & 125 Minor	73 (01 Major & 72 Minor) intersections coming in project alignment shall be improved.

0.21 Railway Track& Proposals

No any Railway track exists on this Project road.

0.22 Cross Drainage Works

0.22.1 Bridges

- **12 bridges** exist on project alignment including one bridge between km 127.319 & km 128.559.
- 2 existing bridges are proposed to reconstruction.
- 1 bridge proposed to widen upto 18m, (at km 127.469, between khowai chowmuhani & South pulinpur)
- 9existing bridges are retained due to realignment.
- 11 additional new minor bridges are proposed on the realignment and bypass.

Details of existing bridges & the proposal of new bridges are tabulated below –

Table 0.16: Major Bridge (Existing)

Sl. No.	Survey Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
Nil						

Table 0.17: Major Bridge (Re-construction)

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
Nil						

Table 0.18: Major Bridge (New-construction)

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
Nil						

Table 0.19: Minor Bridge (Existing)

Sl. No.	Survey Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	15+650	CONCRETE BRIDGE			20.5+19.0 = 39.5	7.5
2	23+000	OLD STEEL TRUSS BRIDGE			30	5
3	26+600	OLD WOODEN BRIDGE			30	3
4	29+650	OLD WOODEN BRIDGE			30	3
5	30+400	CONCRETE BRIDGE			11.4	7.4
6	31+050	OLD WOODEN BRIDGE			30	3
7	38+050	OLD WOODEN BRIDGE			30	3
8	39+850	CONCRETE BRIDGE			9.6	7.5
9	41+550	CONCRETE BRIDGE			11.8	7.4

Table 0.20: Proposal of Minor Bridges (Re-construction)

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	24+060	PSC Girder			2x23.5	18m
2	25+340	RCC Girder			2x20	18m

Table 0.21: Proposal of Minor Bridges (New Construction)

Sl. No.	Chainage (km)	Type of Structure			No. of Spans with span length (m)	Width (m)
		Foundation	Sub-Structure	Super structure		
1	12+915	PSC Girder			2x25	18m
2	17+900	PSC Girder			1x25	18m
3	18+800	RCC Girder			2x20	18m
4	19+770	RCC BOX			2x8	18m
5	21+320	RCC Girder			1x21	18m
6	24+760	RCC Girder			1x21	18m
7	24+930	RCC Girder			1x21	18m
8	29+470	RCC Girder			2x10	18m
9	31+050	PSC Girder			2x25	18m
10	32+870	RCC Girder			1x20	18m
11	34+450	RCC Girder			1x20	18m

Tapper width @ 1:15m shall be adopted to match the road width with CD structure width.

0.22.2 Culverts

Total 54 culverts exist on Project alignment in which -

- 12 culverts are proposed for reconstruction.
- 42 culverts are retained due to proposal of realignments/bypasses.
- 95 new culverts are proposed in entire length as balancing culverts.
- 3 culverts proposed to widen as per two lane +PS formation width between km 127.317 to km 128.559

Table 0.22 – Proposal of Existing Culverts

Existing Detail						New Proposal			
Sl. No.	Existing Chainage (Km)	Type of Structure (Pipe/Slab /Box /Arch)	Span Arrangement		C'way Width (m)	Design Chainage (Km)	Proposal	Type	Size(m)
			No	Vent Width (m) (Clear)					
1	0+400	SLAB	1	1.1	5.8	-	Retained due to Realignment/Bypass		
2	0+450	SLAB	1	1.1	5.8	-	Retained due to Realignment/Bypass		
3	0+500	SLAB	1	1	5.7	-	Retained due to Realignment/Bypass		
4	0+800	SLAB	1	0.9	6.7	-	Retained due to Realignment/Bypass		
5	0+900	SLAB	1	0.9	5	-	Retained due to Realignment/Bypass		
6	1+100	SLAB	1	1.2	4.9	-	Retained due to Realignment/Bypass		
7	1+250	SLAB	1	2	6.4	-	Retained due to Realignment/Bypass		
8	3+500	SLAB	1	0.9	5.2	2+150	Reconstruction	Pipe Culvert	1x1.2m
9	7+450	SLAB	1	1.5	4.2	5+830	Reconstruction	Pipe Culvert	1x1.2m
10	7+750	SLAB	1	1.5	4.2	-	Retained due to Realignment/Bypass		
11	9+250	SLAB	1	1.4	4.1	7+425	Reconstruction	Pipe Culvert	1x1.2m
12	9+550	SLAB	1	1.4	4.1	-	Retained due to Realignment/Bypass		
13	9+600	SLAB	1	1.4	4	-	Retained due to Realignment/Bypass		
14	9+750	PIPE	1	1	4.3	7+880	Reconstruction	Box Culvert	1x2x2m
15	10+000	PIPE	1	1	4	-	Retained due to Realignment/Bypass		
16	10+100	PIPE	1	1	4	-	Retained due to Realignment/Bypass		
17	10+500	SLAB	1	1	5.1	8+490	Reconstruction	Box Culvert	1x5x4m
18	12+600	PIPE	1	1	4.1	10+475	Reconstruction	Pipe Culvert	1x1.2m
19	13+150	PIPE	1	1	4.1	10+930	Reconstruction	Box Culvert	1x2x2m
20	14+490	SLAB	1	1.3	3.7	-	Retained due to Realignment/Bypass		
21	14+750	SLAB	1	1.3	3.7	-	Retained due to Realignment/Bypass		
22	15+100	SLAB	1	0.7	4.2	-	Retained due to Realignment/Bypass		
23	18+650	PIPE	4	1	4	15+530	Reconstruction	Box Culvert	1x2x2m
24	18+800	PIPE	4	1	4	-	Retained due to Realignment/Bypass		

Existing Detail						New Proposal			
Sl. No.	Existing Chainage (Km)	Type of Structure (Pipe/Slab /Box /Arch)	Span Arrangement		C'way Width (m)	Design Chainage (Km)	Proposal	Type	Size(m)
			No	Vent Width (m) (Clear)					
25	19+510	SLAB	1	1.4	4	-	Retained due to Realignment/Bypass		
26	20+000	SLAB	1	0.9	4	-	Retained due to Realignment/Bypass		
27	20+200	SLAB	1	0.9	3.6	-	Retained due to Realignment/Bypass		
28	20+650	PIPE	1	1	3.7	17+070	Reconstruction	Box Culvert	1x2x2m
29	21+200	SLAB	1	0.9	3.6	-	Retained due to Realignment/Bypass		
30	23+500	SLAB	1	1	3.1	-	Retained due to Realignment/Bypass		
31	26+800	PIPE	1	1	3.4	-	Retained due to Realignment/Bypass		
32	28+300	PIPE	2	1	3.6	22+770	Reconstruction	Box Culvert	1x3x4m
33	28+900	PIPE	1	1	4	-	Retained due to Realignment/Bypass		
34	29+550	PIPE	1	1	3.1	-	Retained due to Realignment/Bypass		
35	30+220	PIPE	1	1	3.5	-	Retained due to Realignment/Bypass		
36	30+450	PIPE	1	1	3.5	-	Retained due to Realignment/Bypass		
37	30+650	PIPE	1	0.6	3.7	-	Retained due to Realignment/Bypass		
38	31+150	SLAB	1	1.6	4	-	Retained due to Realignment/Bypass		
39	31+670	SLAB	1	1.6	4	-	Retained due to Realignment/Bypass		
40	33+050	SLAB	1	0.7	3.6	-	Retained due to Realignment/Bypass		
41	34+450	SLAB	1	0.7	3.6	-	Retained due to Realignment/Bypass		
42	35+400	PIPE	1	0.5	3.6	-	Retained due to Realignment/Bypass		
43	36+100	SLAB	1	1.1	3.5	-	Retained due to Realignment/Bypass		
44	39+450	SLAB	1	0.9	3.4	-	Retained due to Realignment/Bypass		
45	40+330	PIPE	3	1	3.6	-	Retained due to Realignment/Bypass		
46	40+690	SLAB	1	0.9	3.5	-	Retained due to Realignment/Bypass		
47	40+750	PIPE	3	1	3.6	33+665	Reconstruction	Box Culvert	1x3x3m
48	40+800	SLAB	1	0.9	3.5	33+720	Reconstruction	Box Culvert	1x2x2m
49	41+700	SLAB	1	0.8	3.4	-	Retained due to Realignment/Bypass		
50	41+800	SLAB	1	0.9	3.6	-	Retained due to Realignment/Bypass		
51	42+050	SLAB	1	0.8	3.4	-	Retained due to Realignment/Bypass		

Existing Detail						New Proposal			
Sl. No.	Existing Chainage (Km)	Type of Structure (Pipe/Slab /Box /Arch)	Span Arrangement		C'way Width (m)	Design Chainage (Km)	Proposal	Type	Size(m)
			No	Vent Width (m) (Clear)					
From km 127.319 to km 128.559									
52	127.619	Box					Widen as per Formation width		
53	127.919	Box					Widen as per Formation width		
54	128.219	Box					Widen as per Formation width		

Culverts (Reconstruction)

Table 0.23 – Proposal of Existing Culverts (Reconstruction)
Details have been shown in table 0.22

Additional Culverts

Table 0.24 – Proposal of additional culverts

Sl. No.	Design Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
1	0+150	Box Culvert	1x2x3	12m
2	0+550	Box Culvert	1x4x3	12m
3	0+785	Box Culvert	1x2x2	12m
4	1+200	Box Culvert	1x2x2	12m
5	1+540	Box Culvert	1x2x2	12m
6	1+850	Box Culvert	1x2x2	12m
7	2+500	Box Culvert	1x2x2	12m
8	2+835	Box Culvert	1x2x3	12m
9	3+170	Pipe Culvert	1x1.2	20m
10	3+570	Box Culvert	1x2x2	12m
11	3+850	Box Culvert	1x2x2	12m
12	4+200	Box Culvert	1x2x2	12m
13	4+550	Box Culvert	1x2x2	12m
14	4+900	Box Culvert	1x2x2	12m
15	5+150	Box Culvert	1x2x2	12m
16	5+500	Box Culvert	1x2x2	12m

Sl. No.	Design Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
17	6+120	Pipe Culvert	1x1.2	20m
18	6+500	Box Culvert	1x2x2	12m
19	6+850	Pipe Culvert	1x1.2	22.5m
20	7+710	Pipe Culvert	1x1.2	27.5m
21	8+100	Pipe Culvert	1x1.2	30m
22	8+780	Box Culvert	1x2x2	12m
23	9+100	Pipe Culvert	1x1.2	20m
24	9+500	Box Culvert	1x2x2	12m
25	9+800	Box Culvert	1x2x2	12m
26	10+100	Box Culvert	1x2x2	12m
27	10+700	Pipe Culvert	1x1.2	20m
28	11+410	Pipe Culvert	1x1.2	22.5m
29	11+750	Box Culvert	1x2x2	12m
30	12+110	Box Culvert	1x2x2	12m
31	12+525	Pipe Culvert	1x1.2	27.5m
32	12+690	Box Culvert	1x5x4	12m
33	13+130	Box Culvert	1x2x2	12m
34	13+440	Box Culvert	1x2x2	12m
35	13+740	Box Culvert	1x2x2	12m
36	14+040	Box Culvert	1x2x2	12m
37	14+390	Box Culvert	1x2x2	12m
38	14+690	Box Culvert	1x2x2	12m
39	15+040	Box Culvert	1x2x2	12m
40	15+190	Pipe Culvert	1x1.2	27.5m
41	15+650	Box Culvert	1x2x2	12m
42	15+970	Box Culvert	1x2x2	12m
43	16+290	Box Culvert	1x2x3	12m
44	16+590	Box Culvert	1x2x2	12m
45	16+850	Box Culvert	1x2x2	12m
46	17+390	Box Culvert	1x2x2	12m
47	17+790	Box Culvert	1x5x4	12m
48	18+090	Box Culvert	1x2x2	12m
49	18+390	Box Culvert	1x2x2	12m
50	18+740	Box Culvert	1x2x2	12m
51	19+090	Box Culvert	1x2x2	12m
52	19+440	Box Culvert	1x2x2	12m
53	20+090	Box Culvert	1x2x2	12m

Sl. No.	Design Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
54	20+440	Box Culvert	1x2x2	12m
55	20+790	Box Culvert	1x2x2	12m
56	21+090	Box Culvert	1x2x2	12m
57	21+490	Box Culvert	1x4x5	12m
58	21+680	Box Culvert	1x2x2	12m
59	21+990	Box Culvert	1x2x2	12m
60	22+285	Box Culvert	1x4x4	12m
61	23+000	Box Culvert	1x2x2	12m
62	23+300	Pipe Culvert	1x1.2	30m
63	23+690	Pipe Culvert	1x1.2	30m
64	23+950	Box Culvert	1x3x4	12m
65	24+550	Box Culvert	1x2x2	12m
66	25+440	Box Culvert	1x2x2	12m
67	25+760	Box Culvert	1x2x2	12m
68	25+945	Pipe Culvert	1x1.2	27.5m
69	26+410	Box Culvert	1x4x5	12m
70	26+760	Box Culvert	1x2x2	12m
71	27+090	Box Culvert	1x2x2	12m
72	27+400	Box Culvert	1x2x2	12m
73	27+700	Box Culvert	1x2x2	12m
74	27+960	Box Culvert	1x2x2	12m
75	28+400	Box Culvert	1x2x2	12m
76	28+820	Pipe Culvert	1x1.2	22.5m
77	29+060	Box Culvert	1x2x2	12m
78	29+380	Pipe Culvert	1x1.2	17.5m
79	29+630	Box Culvert	1x2x2	12m
80	29+820	Box Culvert	1x2x2	12m
81	30+840	Pipe Culvert	1x1.2	25m
82	31+090	Pipe Culvert	1x1.2	30m
83	31+550	Box Culvert	1x2x2	12m
84	31+950	Pipe Culvert	1x1.2	30m
85	32+300	Box Culvert	1x2x2	12m
86	32+600	Box Culvert	1x2x2	12m
87	33+390	Box Culvert	1x4x4	12m
88	33+600	Box Culvert	1x2x3	12m
89	33+950	Box Culvert	1x2x3	12m
90	34+245	Box Culvert	1x3x4	12m

Sl. No.	Design Chainage (Km)	Type of Culvert	Span / Opening with span length (m)	Width (m)
91	34+630	Box Culvert	1x4x5	12m
92	34+890	Box Culvert	1x3x4	12m
93	35+300	Pipe Culvert	1x1.2	12.5m
94	35+590	Pipe Culvert	1x1.2	27.5m
95	35+940	Box Culvert	1x2x2	12m

0.23 Bus Lay Byes

16 (3 x 2) Bus bays are proposed on both side of Project road.
The locations are–

Table 0.25- Proposed Bus Bays

Sl. No.	Design Chainage (Km)		Remarks
	LHS	RHS	
1	1.430	1.020	
2	17.200	16.965	
3	33.140	33.010	

0.24 Truck Lay Bye

- No Truck lay bye exist along the Project road,
- 1 Truck lay bye is proposed, the locations are

Table 0.26- Proposed Truck Lay Bye

Sl. No.	Proposed Chainage (Km)	Side
1	28.600	LHS

0.25 Religious Structures

2 religious structures exist along the project road and their details are presented in table below-

Table 0.27: Religious Structures

Sl. No.	Design Chainage (km)	Existing Chainage (km)	Side	Type	Remarks
1	2+720	4+100	LHS	Temple	Refer Existing Chainage
2	28+450	34+950	LHS	Temple	Refer Existing Chainage

0.26 School Details

3 School exist along the project road and details are presented in table below:

Table 0.28: School Details

Sl. No.	Design Chainage (km)	Existing Chainage (km)	Side	Type	Remarks
1	3+200	4+550	RHS	School	Refer Existing Chainage
2	23+270	28+850	RHS	School	Refer Existing Chainage
3	25+300	31+000	LHS	School	Refer Existing Chainage

0.26 Pond Location

36 ponds exist along the project road and details are presented in table below:

Table 0.29: Pond Locations

Sl. No.	Design Chainage (Km)	Side	Remarks
1	0+050	LHS	
2	0+150	RHS	
3	0+200	LHS	
4	0+670	BHS	
5	0+760	BHS	
6	11+850	BHS	
7	11+900	RHS	
8	12+220	LHS	

Sl. No.	Design Chainage (Km)	Side	Remarks
9	12+370	BHS	
10	12+650	LHS	
11	12+750	BHS	
12	15+300	LHS	
13	15+360	BHS	
14	17+500	BHS	
15	17+750	LHS	
16	18+600	BHS	
17	18+720	BHS	
18	18+900	BHS	
19	21+170	BHS	
20	21+870	BHS	
21	22+200	BHS	
22	22+280	BHS	
23	23+320	LHS	
24	23+800	RHS	
25	24+280	BHS	
26	24+600	BHS	
27	24+800	BHS	
28	25+000	RHS	
29	25+630	BHS	
30	30+850	BHS	
31	33+200	RHS	
32	35+280	BHS	
33	33+400	BHS	
34	33+850	BHS	
35	34+580	RHS	
36	35+500	BHS	

Retaining wall with sad filling is proposed on above locations to protect seepage in embankment.

0.27 Toll Plaza

No toll plaza is exist and proposed.

0.28 Submergence Details

The existing road found submergence at some locations, although realignments are proposed in maximum length for betterment of its geometry and a minimum height of 2.5m is considered of embankment to keep away from submergence.

0.29 Proposed Bypasses& Realignments

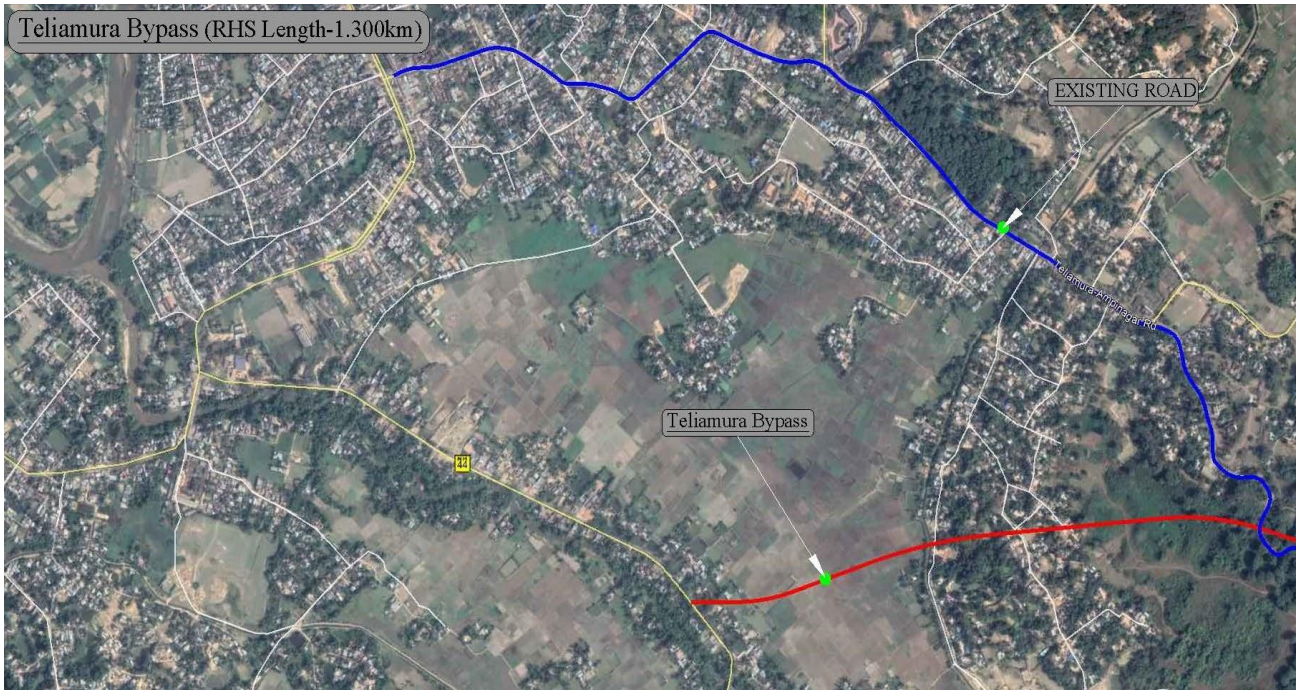
0.29.1 Bypasses

Total 4 bypasses are proposed in this section of Project road (upto design km 36.000, Amarpur bypass will end in Package III), the details are –

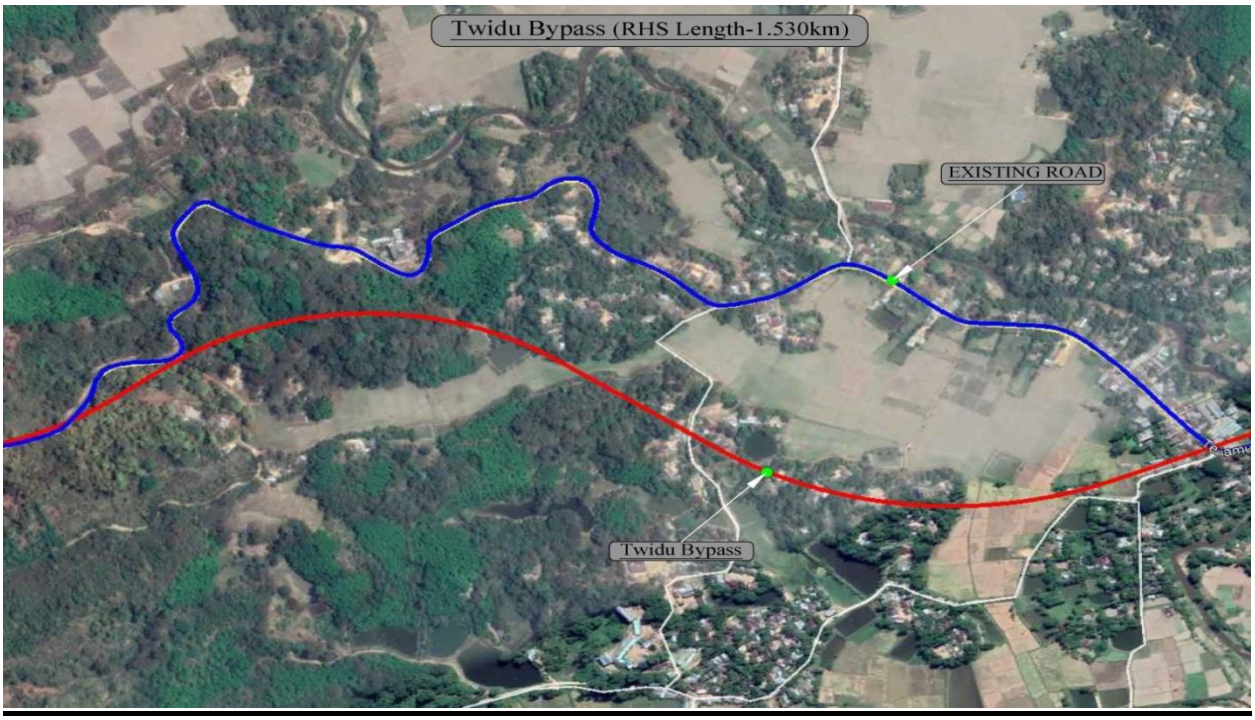
Table 0.30: Details of Bypass

Sl. No	Existing Chainage (Km)			Design Chainage (Km)			Bypass Name
	From	To	Length (m)	From	To	Length (m)	
1	0+000	2+560	2.560	0+000	1+300	1.300	Teliamura Bypass
2	13+550	15+550	2.000	11+300	12+830	1.530	Twidu Bypass
3	20+650	24+750	4.100	17+075	19+840	2.765	Ompi Nagar Bypass
4	42+450	50+900	8.450	35+240	42+760	7.520	Amarpur Bypass

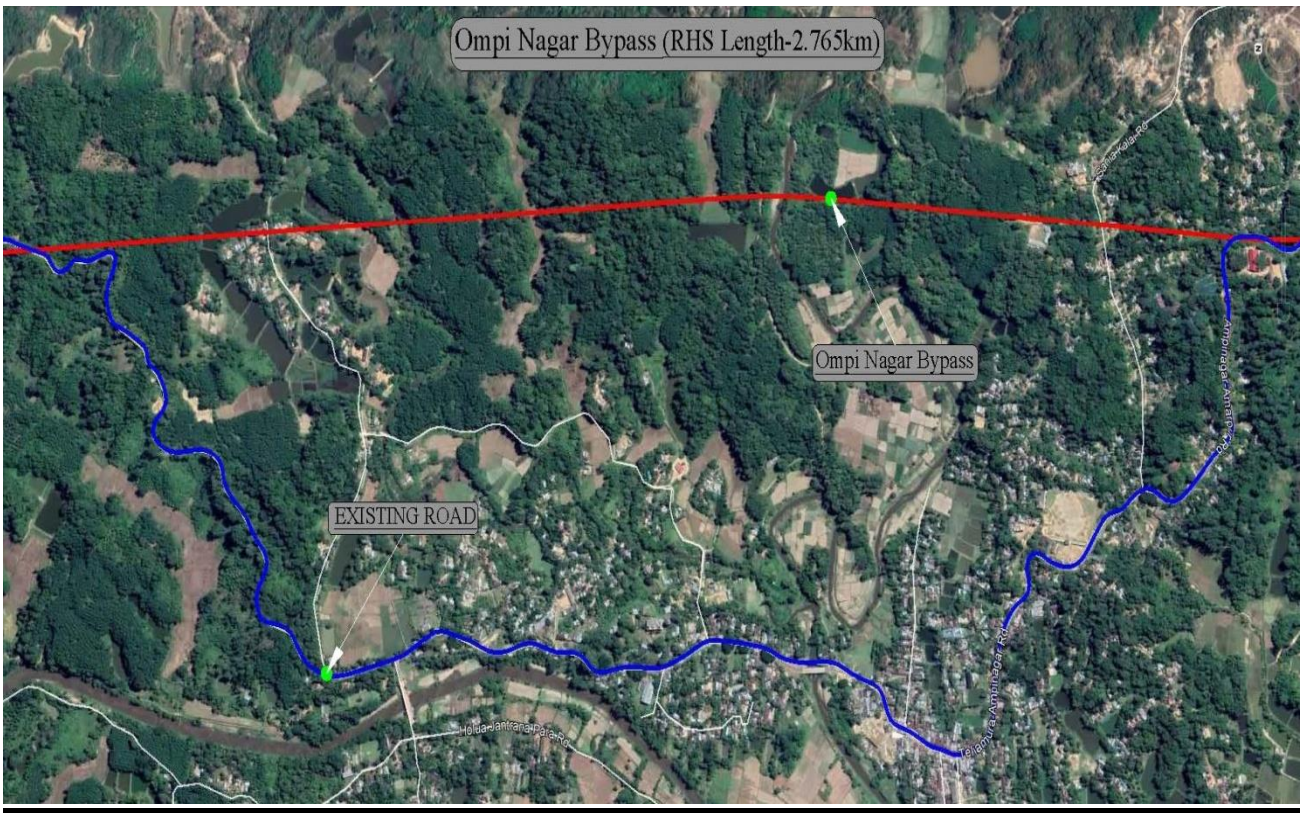
1. Teliamura Bypass



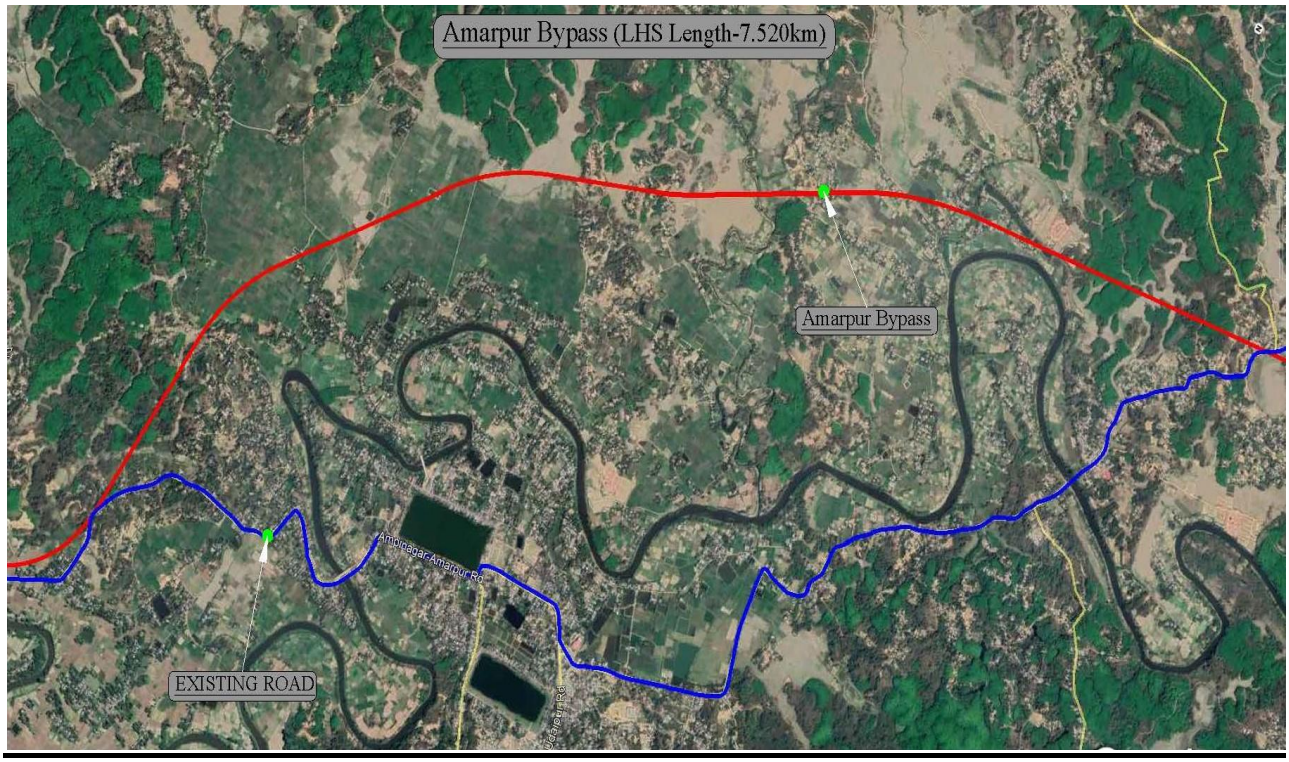
2. Twidu Bypass



3. Ompi Nagar Bypass



4. Amarpur Bypass



0.29.2 Realignments

Except above bypasses some re-alignments are also proposed for improvement of existing geometry, the details of these realignments are:

Table 0.31: Details of Realignments

Sl. No	Existing Chainage (Km)			Design Chainage (Km)			Remarks
	From	To	Length	From	To	Length	
1	2560	4490	1.93	1300	3130	1.83	
2	4675	5475	0.80	3320	4100	0.78	
3	5850	10825	4.98	4470	8800	4.33	
4	11600	12875	1.28	9550	10650	1.10	
5	15550	20650	5.10	12830	17075	4.25	
6	24750	29150	4.40	19840	23550	3.71	
7	29450	38525	9.08	23840	31500	7.66	
8	38750	40775	2.03	31720	33700	1.98	
9	42250	42450	0.20	34170	35240	1.07	

0.30 Protection Works

Protection works like Retaining walls, Breast Walls, W-Beam crash barrier are provided at different locations as per site requirement, the details of protection works with their details are presented below:-

a) Breast walls –

Table 0.32

Sl. No.	Description	LHS (m)	RHS (m)	Section
1	Breast Wall 1m height	847	933	Km 0+0 to km 36+0
2	Breast Wall 2m height	1214	1340	
3	Breast Wall 3m height	957	1056	
4	Breast Wall 4m height	662	731	
	Total	**3680**	**4060**	

The chainage wise details of Breast wall is presented in Vol. 8:: Bill of Quantity

b) **Retaining Wall** - Retaining wall is proposed for length given below:

Table 0.33

Sl. No.	Description	Km 0.0 to km 36.0
1	Retaining wall 1.5m height	3970
2	Retaining wall 3.0m height	2230
3	Retaining wall 1.5m height in Pond areas (minimum)	1210
	Total	**7410**

c) **W-Beam crash Barrier**- W- Beam crash barrier is proposed in **21220m** length (Where height of embankment is more than 3.0m), The chainage wise detail of W-Beam crash barrier is presented in Vol. 8:: Bill of Quantity.

d) **RCC Drain** - RCC linear drain of 1.75m wide is provided in **2060m** length.

e) **PCC Drain** - PCC drain is provided in **15180m** length. The chainage wise detail of PCC drain is presented in Vol. 8:: Bill of Quantity.

f) **Unlined surface drain** – Unlined surface drain is provided in **40.276 km** length.

g) **Providing PC** on embankment slope at bridge approaches

The Details of above all protection works has been provided in Vol.8:: Bill of Quantity.

0.31 Road Side furniture

Road side furniture shall be provided in accordance with Section 11 of the Manual of Specification and Standards for Two Laning of Highways through EPC.

0.32 Landscaping and Tree Plantation

Landscaping and tree plantation shall be provided in accordance with Section 12 of the Manual of specification and Standards for Two Laning of Highways through EPC.

0.33 Highways Lighting

Street lighting shall be provided in accordance with para 13.3 of Section 13 of the Manual of Specification and Standards for Two Laning of Highways through EPC.

0.34 Safety

Keeping view of these all features, a proper safety precautions are recommended on roadway width, the safety items to be provided are –

i) W Beam Crash Barrier/ Concrete Crash Barrier on either side of carriageway,
ii) Pavement Marking on Centre and edges lines,
iii) Provide adequate warning of hazards,
iv) Providing Bio-turfing for Slope protection,

0.35 Utilities

Utilities shifting estimates have been obtained from concerned departments, the details of amount received from departments is Rs 5.29 Cr –

SI NO.	Package	Chainage		DWS Amount	WRD Amount	TSECL Amount	Total Amount
		From	To				
1	Package 1	0+000	18+000	7242423	142779	22831995	30217197
		18+000	36+000	6226065	965755	8626461	15818281
		Junction		2020273	166280	4718768	6905322
				15488761	**1274814**	**36177224**	**52940800**

0.36 Land Acquisition

Approximate Rs 184.000 Cr considered for land acquisition of package 2 as per average circle rate.

0.37 Forest Clearance

Approximate Rs 29.000 Cr considered for Forest clearance of package 2.

0.38 Resettlement and Rehabilitation (R & R) Policy

The Ministry of Rural Development (Department of Land resources) has prepared the National Policy on Resettlement and Rehabilitation for the people who will be affected by the project. The policy describes the principle and approach to minimize and mitigate the negative social and economic impacts caused by the project. The R & R policy broadly addresses all issues such as compensation, assistance, replacement value, vulnerable group, etc. The policy ensures that people affected by project must be able to restore their livelihood to the pre project level.