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 Private Limited. for preparation of Detailed Project Report i.e. – **Kailashahar – Kurti bridge (near Kataltali town) – Section (NH 208 A).**
The existing length of project road is 41.865 Km and design length is 36.460 Km.

This packages has been divided into three sections and this report contains the details of section III :: design km 25.250 to km 36.460.

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

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 **Kailashahar-Kurti Bridge Section (NH-208A).**

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

Sl. No.	Position	Name
1	Team Leader	**Mr. Bhola Shanker Pandey**
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 Co-Ordinates of Proposed Centre Line

The Co-ordinates of Proposed Centre line @ 20m interval are presented at the end of this chapter **Table 0.25**

0.7 Project Alignment Description

The Project road starts from Chirakoti junction at Kailashahar Town (Junction of Kumarghat road, Dharmanagar Road & Kailashahar Road), passes through Chini bagan, Juboraj nagar, Dharamnagar, Lalcherra, Khailalcherra, Kadamtala and ends at Kurti bridge (500m before Kataltali town). The existing length of project road is 41.865 Km and design length is 36.460 Km.

This packages has been divided into three sections and this report contains the details of section III :: design km 25.250 to km 36.460.

Existing lane of Project road varies from two lane to single lane with fair to poor riding quality.

The Project Road alignment shown in figure below-

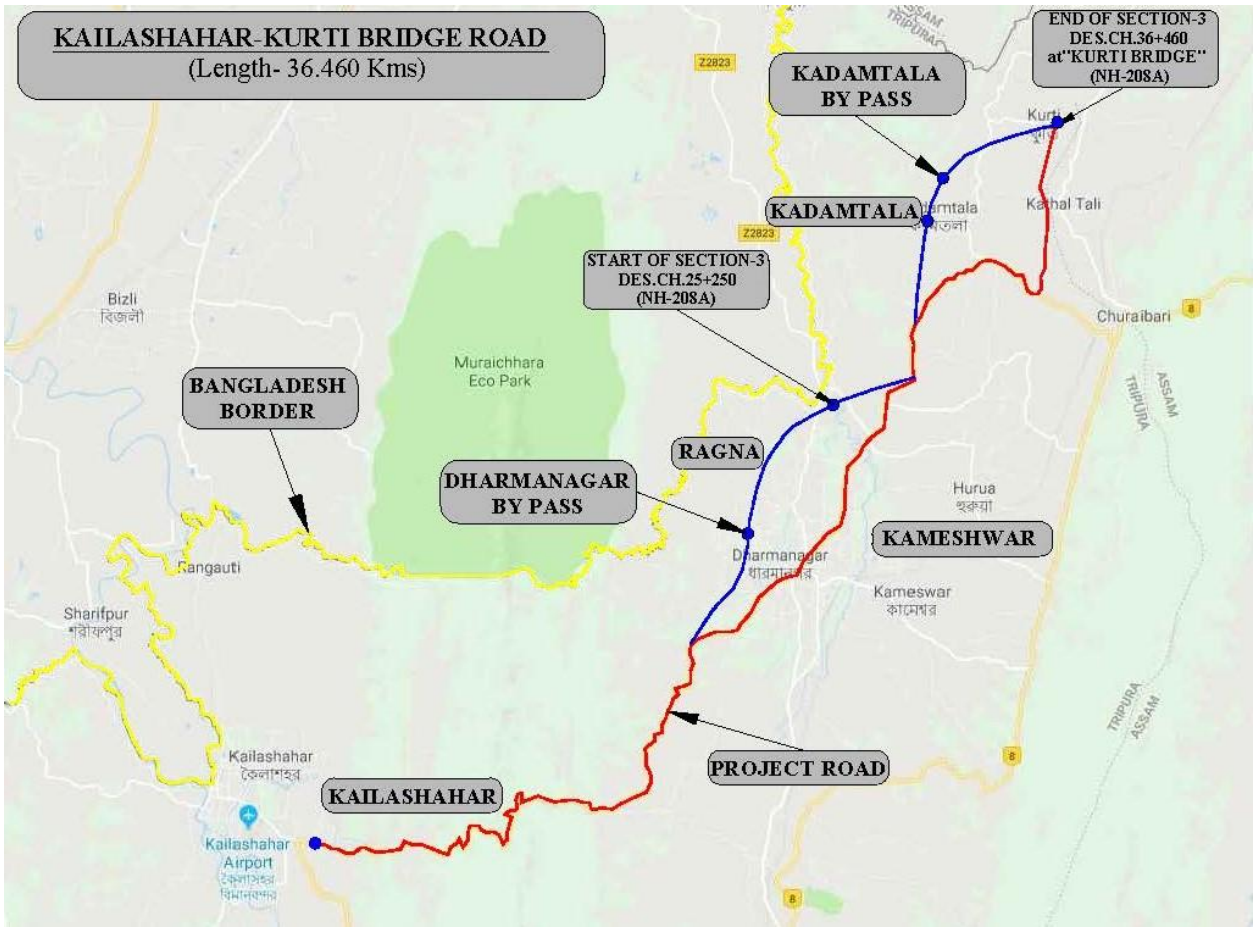


Figure 0.1– Key Map of Project Road

0.8 Right of Way (ROW)

The existing RoW is varying from 15 - 25m. Due to serpentine alignment of existing road, the new alignment has been proposed in open area maximum of its length (approximate 80% of design length).

The proposed RoW kept 30m in maximum length, wherever toe width is coming more than 30m, the proposed RoW has been taken maximum of its width.

The detail of proposed RoW has tabulated below:-

Table 0.2 Details of Proposed RoW

Sl. No.	Design Chainage(km)		Length (m)	PROW		Total PROW
	From	To		LHS	RHS	
1	25+250	26+750	1500	15	15	30
2	26+750	26+900	150	18	18	36
3	26+900	31+400	4500	15	15	30
4	31+400	31+750	350	15	15	30
5	31+750	31+900	150	18	18	36
6	31+900	32+200	300	15	15	30
7	32+200	32+400	200	16	16	32
8	32+400	36+460	4060	15	15	30

0.9 Abutting Land Use Pattern

The Project road passes through open, built-up & Forest areas. Main built-up are Chini bagan, Juboraj nagar, Dharam nagar, Lalcherra, Khailalcherra, Kadamtola. The approx. %age of land use pattern along the Project road is –
Open / Forest – 32 Km & Builtup – 9 Km

The details of Forest length will be described after confirmation of forest land length from concerned department.
Land use pattern in graphical view is as follows-

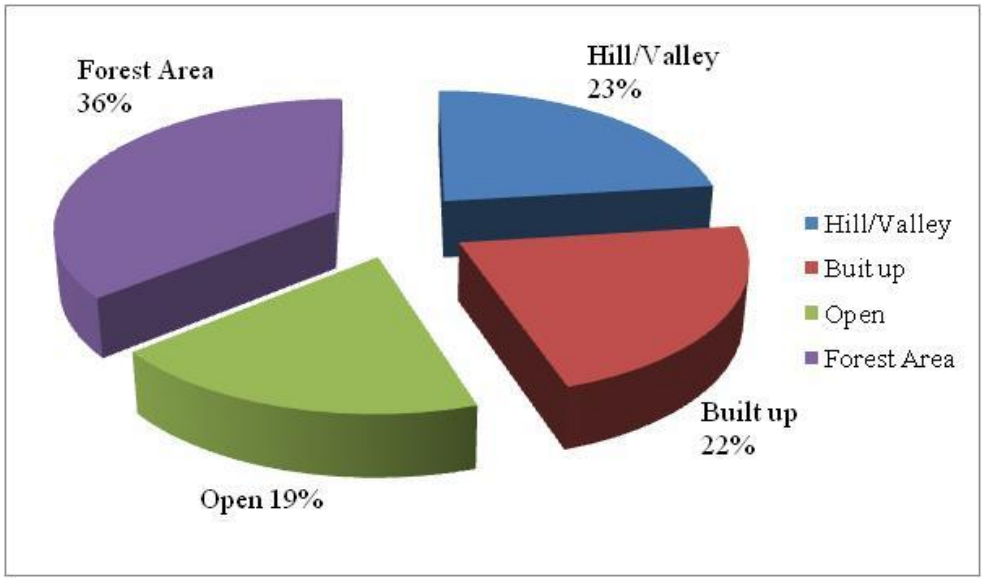


Fig 0.2 Land use pattern

The existing terrain details with reference to design chainage is presented below:-

Table 0.3 – Details of Terrain

Sl. No	Chainage From (Km)	Chainage To (Km)	Length (m)	Terrain	Remarks
1	25+250	36+460	11+210	Plain & Rolling	

0.10Terrain

Terrain is Plain, Rolling.

- **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 **Table 0.4.**

Table 0.4- Design Parameters

<table>
<tr><th>Item</th><th>Plain / Rolling Terrain</th><th>Reference</th></tr>
<tr><td>Design Speed (kmph)</td><td>Ruling -100 Kmph (P) / 60kmph (M)
Min.- 80 kmph (P) / 40kmph (M)</td><td>Table 2.1</td></tr>
<tr><td>Sight distance (minimum)</td><td>180 m (SSD) & 360m (ISD)</td><td>Table 2.6</td></tr>
<tr><td>Proposed Land width (ROW)</td><td>as per table 0.2 of “Executive summary”</td><td></td></tr>
<tr><td>Lane configuration</td><td>2-lane with paved shoulders</td><td></td></tr>
<tr><td>Formation width</td><td>7.0 m of carriageway + 2.5 m Paved shoulder + 1.5m earthen shoulder (Fig. 2.2) of two lane manual (IRC SP-73 : 2018</td><td></td></tr>
<tr><td rowspan="2">Edge strip</td><td>.25m Raised median</td><td></td></tr>
<tr><td>.5m Depressed Median</td><td></td></tr>
<tr><td>Camber/cross fall</td><td>2.5 %</td><td>Table 2.7</td></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): 1 (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& Kerb & Channel Drain in hill sections.</td><td></td></tr>
</table>

0.11 Surveys & Investigation

0.11.1 Traffic Surveys

Traffic surveys have been conducted at two locations.

Table 0.5: Details of Traffic count locations

Sl. No.	Section	Chainage (Km)	Remarks to Capture
1	Section I :: Km 0 to Km 27.0 (Kailashahar – Dharamnagar section)	Near Km 22.0 near Devenpasha	Traffic coming from Agartala, Kumarghat & moving towards Dharam nagar, Assam etc (both ways)
2	Section II :: Km 27.0 to Km 41.00 (Dharamnagar – Kurti Bridge section)	Near Km 31.0, near Nutan Bazar	Traffic coming from Agartala, Kumarghat, Dharamnagar & moving towards local areas, Assam etc (both ways)

Growth Rate

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

AADT, CVPD &Projected Traffic

Table 0.6- Commercial Vehicle Per day

SL. No.	Location	AADT	PCU	CVPD	Remarks
1	Km 22.00 (near Devenpasha)	2155	2015	301	
2	Km 31.00 (near Nutan bazaar)	2900	2494	196	

Projected traffic on the project road is given below:

Table 0.7- Projected traffic

Year	Likely traffic on the Project road		
	PCU at km 22.00 (Near Devenpasha)	PCU at km 31.00 (Near Nutan Bazaar)	Requirement of
2017	2015	2494	2 Lane with paved shoulder
2020	2779	3402	
2025	3540	4337	
2030	4509	5539	
2035	5748	7066	
2040	7331	9019	

As per the projected traffic & MoRT&H circular dated 26th May 2016, requirement of four lane is not qualifying up to year 2035 (For Plain terrain = 10000PCU per day, for Rolling terrain = 8500 PCU per day & for Mountainous terrain = 6000 PCU per day), However, keeping view of importance of Project road, it is proposed to develop the project road as two lane with paved shoulder facility.

0.11.2 Axle load survey:

Though CVPD (as per above table) on two locations are found very less (301 & 196), 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 3.9 (for initial traffic volume 150-1500).

0.11.3 Testing of soil from existing embankment

The data has been collected pertaining to pavement composition by digging test pit at desired interval along the road. Following are the details:-

Table 0.8: Pavement Composition

Existing Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer(mm)	*Brick Soling(mm)*	*Sub base Course(mm)*	
Dharmanagar Town					
28+000	RHS	30	200	-	230
28+500	LHS	35	230	-	265
29+000	RHS	40	250	-	290
29+500	LHS	45	170	-	215
30+000	RHS	30	145	-	175
30+500	LHS	30	210	-	240
31+000	RHS	40	175	-	215
31+500	LHS	35	220	-	255
32+000	RHS	40	240	-	280
32+500	LHS	40	205	-	245
33+000	RHS	40	160	-	200
33+500	LHS	30	195	-	225
34+000	RHS	45	235	-	280
34+500	LHS	40	145	-	185
35+000	RHS	40	185	-	225
35+500	LHS	35	170	-	205
36+000	RHS	35	235	-	270
36+500	LHS	35	200	-	235
37+000	RHS	35	170	-	205
37+500	LHS	45	240	-	285
38+000	RHS	30	245	-	275
38+500	LHS	35	250	-	285
39+000	RHS	35	250	-	285
39+500	LHS	30	210	-	240
40+000	RHS	40	150	-	190
40+500	LHS	35	210	-	245
41+000	RHS	40	170	-	210
41+500	LHS	40	190	-	230

Existing crust composition details

Test Result of Collected Soil samples –

The Soil samples for sub-grade collected along the Project road as per ToR clause 4.11.3.3, page no. 51. The details of tested samples are tabulated below –

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 :.2.of..3....

Location: - Kurti Bridge Section

Sl.No.	Chainage No. (Km)	MDD (g/cc)	OMC (%)	Unsoaked CBR (%)	Soaked CBR (%)	Swelling Index (%)
01	5.00	1.901	12.30	19.82	10.03	2.85
02	10.00	1.843	11.65	19.57	9.48	3.02
03	15.00	1.818	16.00	16.04	8.43	3.29
04	30.00	1.824	15.0	17.43	8.86	3.13
05	35.00	1.806	14.21	15.67	7.82	3.21
06	40.00	1.862	13.48	18.57	9.62	2.92
07	Borrow Area Near Km 20.00	1.798	14.76	15.46	7.55	3.43

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.

The details of laboratory test of these samples has been presented as Annexure 1.9 in Vol. I A – Annexure to Main Report

0.11.4 Material survey

Aggregate quarry for structure works and road works is identified at Silchar (Assam) which is Approx120 km away from Dharmanagar.

Sand source has been located from local river with average lead of 15 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 Haldia IOCL with lead of approx. 1500 km.

0.11.5 Geotechnical Investigations

Geotechnical Investigations being carried out at site and the results has been submitted with separate volume.

0.12 Development Proposals

0.12.1 Pavement Design

Considering a growth rate of 5 % and VDF as 3.9 obtained from the IRC, design of pavement as per IRC 37 -2018 for a design life of minimum 20 years.
Accordingly design traffic has been worked out as 20MSA (as per 5.4.1 (i) of Two lane manual 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 (Plate 20) is as under:

- BC - 30 mm
- DBM - 50 mm
- CT Base - 150 mm
- CT Sub Base - 200 mm

0.12.2 Typical Cross Section and Widening Scheme

i) **Roadway width -**

a. **For Plain areas -** Roadway width of 15.00 (7.0+2x2.5+2x1.5) is proposed for sections with 2 lane plus paved shoulders of 2.50m and unpaved shoulder of 1.50m on either side in plain areas and,

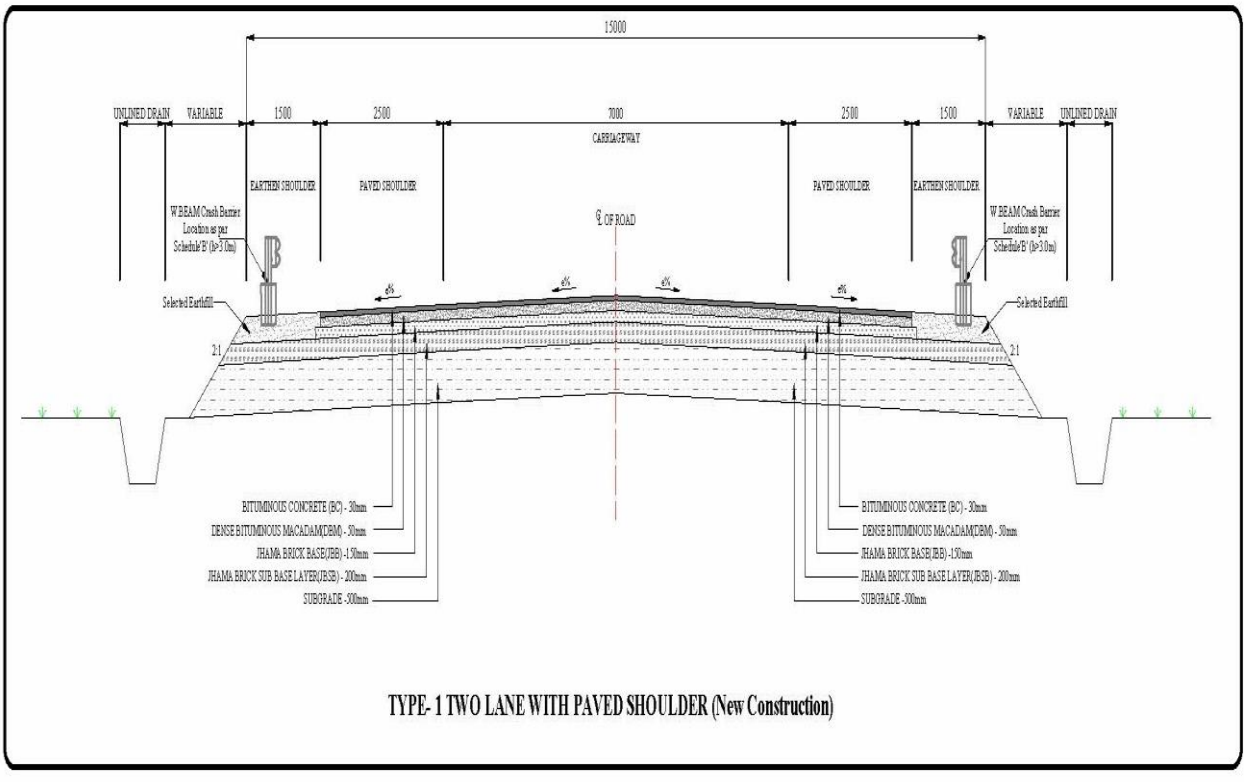
b. **For Built-up areas -** Roadway width of 12.00 (7.0+2x2.5) is proposed for sections with 2 lane plus paved shoulders of 2.50m and RCC covered drain of 1m wide on either side of Road way,

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 1.50wide and paved shoulder of 2.50m are proposed on either side of the Carriage way

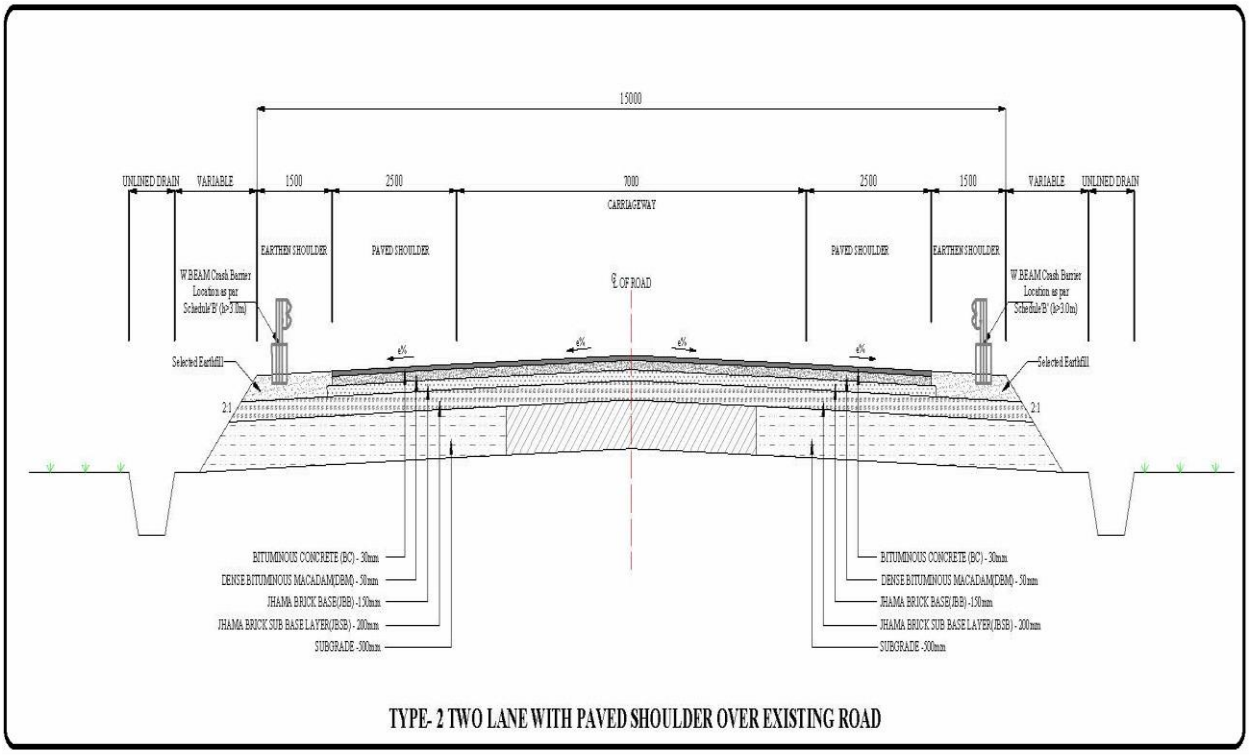
Proposed Typical cross sections (As per Flexible pavement) are shown here –



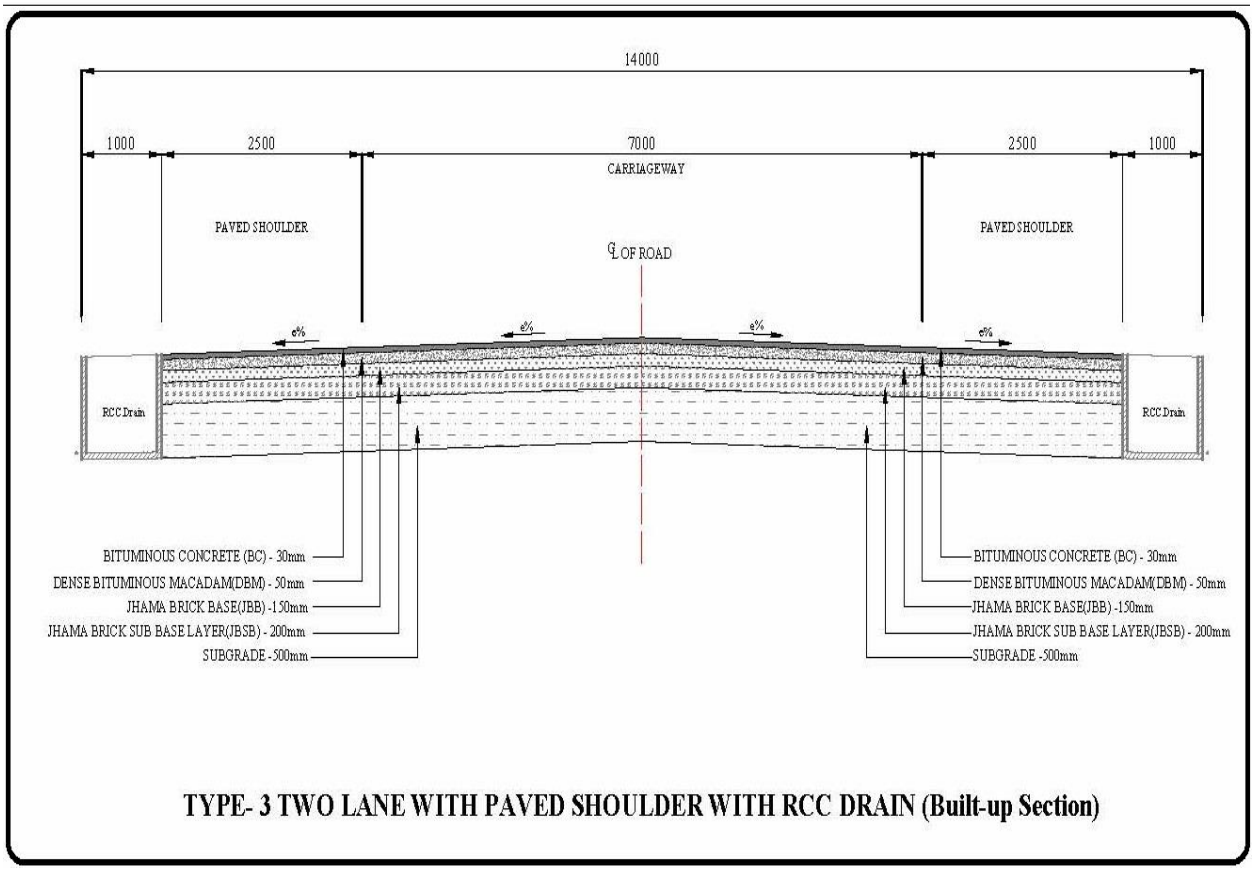
TYPE- 1 TWO LANE WITH PAVED SHOULDER (New Construction)

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]



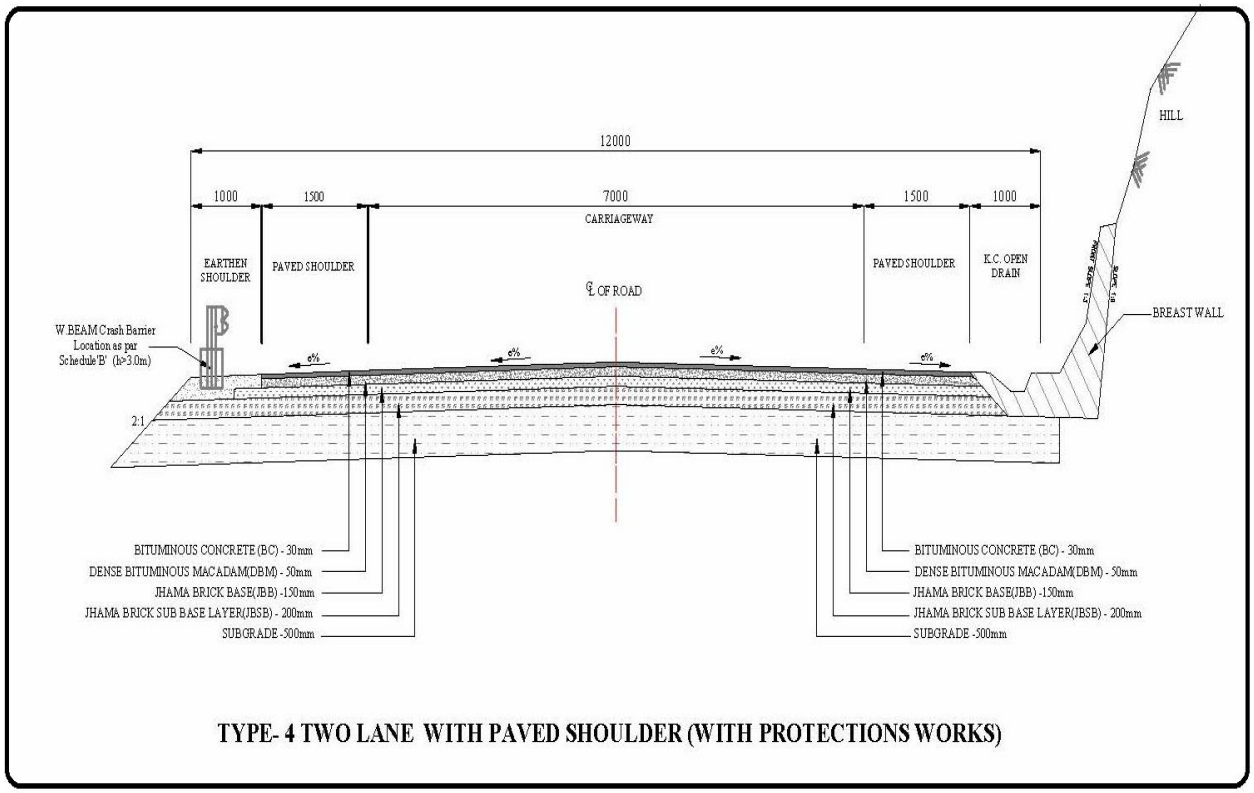
TYPE- 2 TWO LANE WITH PAVED SHOULDER OVER EXISTING ROAD



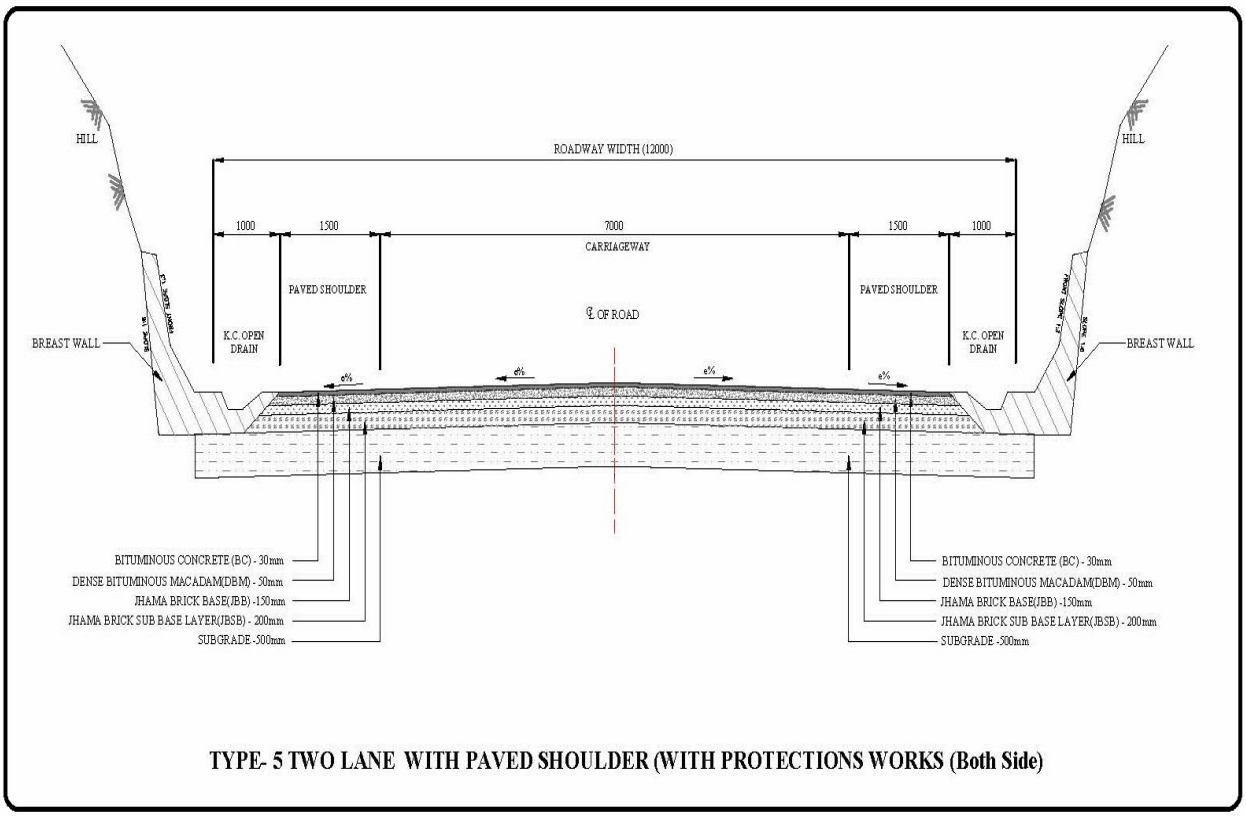
TYPE- 3 TWO LANE WITH PAVED SHOULDER WITH RCC DRAIN (Built-up Section)

Consultancy services for 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**.

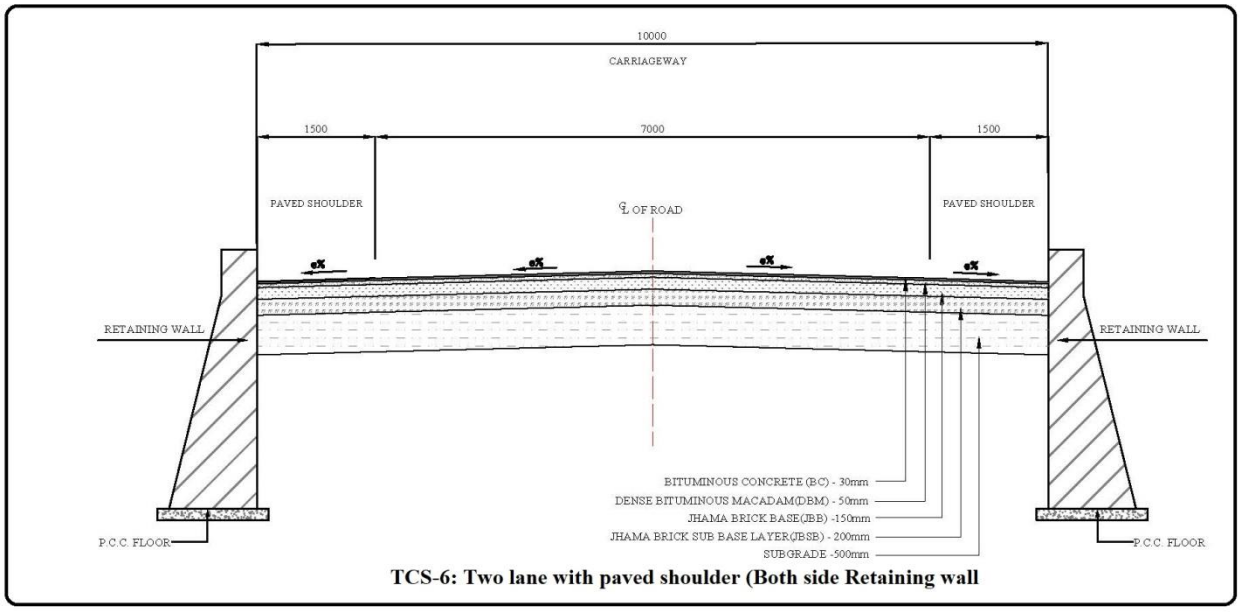
Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]



TYPE- 4 TWO LANE WITH PAVED SHOULDER (WITH PROTECTIONS WORKS)



TYPE- 5 TWO LANE WITH PAVED SHOULDER (WITH PROTECTIONS WORKS (Both Side)



TCS-6: Two lane with paved shoulder (Both side Retaining wall

0.12.3 Horizontal & Vertical alignment report of Project road

Horizontal Alignment Report

Table 0. 9 – Horizontal Design Report

Curve No.	HORIZONTAL CURVE				Terrain	Transition length	Speed	Reason for Deviation
	Start Chainage	End Chainage	Radius	Direction			(Kmph)	
1	27+543.180	28+585.812	1200	Left	Plain	40	100	
2	29+910.493	30+108.152	2000	Left	Plain	0	100	
3	32+687.508	32+888.275	2000	Right	Plain	0	100	
4	33+807.510	34+281.224	500	Right	Plain	45	80	
5	34+573.590	34+946.789	500	Left	Plain	45	80	
6	35+186.728	35+406.087	600	Right	Plain	80	100	
7	36+209.167	36+344.682	400	Left	Plain	55	80	

Vertical Alignment

Table 0.10 – Vertical Design Report

PVI	PVI		Curve	Gradient		Chainage(m)		Type Of Curve	K Value
No	Design Chainage (m)	Level (m)	Length	IN	OUT	Start of Curve	End of Curve		
1	25+529.679	23.091	250	-0.44	-0.469	25+404.679	25+654.679	Hog	8581.369
2	26+040.476	20.693	200	-0.469	0.745	25+940.476	26+140.476	Sag	164.636
3	26+350.000	23	200	0.745	0	26+250.000	26+450.000	Hog	268.335
4	26+650.000	23	250.063	0	-0.254	26+524.969	26+775.031	Hog	982.597
5	27+099.131	21.857	300	-0.254	0.326	26+949.131	27+249.131	Sag	517.015
6	27+450.000	23	200	0.326	0	27+350.000	27+550.000	Hog	613.944
7	27+750.000	23	250	0	-0.109	27+625.000	27+875.000	Hog	2289.24
8	28+790.555	21.864	300	-0.109	0.692	28+640.555	28+940.555	Sag	374.273
9	30+224.518	31.792	550	0.692	0.274	29+949.518	30+499.518	Hog	1313.968
10	30+944.078	33.762	200	0.274	-0.677	30+844.078	31+044.078	Hog	210.437
11	31+500.000	30	250	-0.677	-0.802	31+375.000	31+625.000	Hog	1995.693
12	32+485.951	22.094	200	-0.802	0.358	32+385.951	32+585.951	Sag	172.442
13	33+479.304	25.649	350	0.358	-0.23	33+304.304	33+654.304	Hog	595.678
14	34+814.504	22.582	250	-0.23	-0.064	34+689.504	34+939.504	Sag	1512.026
15	36+127.344	21.738	150	-0.064	1.197	36+052.344	36+202.344	Sag	118.963

0.13 Road Junctions/ Intersections

28 junctions exist on the project road and details of junctions are presented in **Table below**.

Table 0.11: Details of the intersections

Existing Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer(mm)	*Brick Soling(mm)*	*Sub base Course(mm)*	
Dharmanagar Town					
28+000	RHS	30	200	-	230
28+500	LHS	35	230	-	265
29+000	RHS	40	250	-	290
29+500	LHS	45	170	-	215
30+000	RHS	30	145	-	175
30+500	LHS	30	210	-	240
31+000	RHS	40	175	-	215
31+500	LHS	35	220	-	255
32+000	RHS	40	240	-	280
32+500	LHS	40	205	-	245
33+000	RHS	40	160	-	200
33+500	LHS	30	195	-	225
34+000	RHS	45	235	-	280
34+500	LHS	40	145	-	185
35+000	RHS	40	185	-	225
35+500	LHS	35	170	-	205
36+000	RHS	35	235	-	270
36+500	LHS	35	200	-	235
37+000	RHS	35	170	-	205
37+500	LHS	45	240	-	285
38+000	RHS	30	245	-	275
38+500	LHS	35	250	-	285
39+000	RHS	35	250	-	285
39+500	LHS	30	210	-	240
40+000	RHS	40	150	-	190
40+500	LHS	35	210	-	245
41+000	RHS	40	170	-	210

Existing Chainage (Km)	*Position of Pit*	*Pavement Composition*			*Total (mm)*
		Bitumen Layer(mm)	*Brick Soling(mm)*	*Sub base Course(mm)*	
Dharmanagar Town					
41+500	LHS	40	190	-	230

All these intersections are proposed to develop at grade only.

0.13.1 Religious Structures

9 Religious Structures exist on the project road and details of Religious structures are presented in **Table below**.

Table 0.12: Details of Religious Structures

Sl. No.	Existing Chainage(Km)	Side	Remarks
1	29+620	LHS	
2	32+800	RHS	
3	34+380	LHS	
4	35+300	LHS	
5	36+800	LHS	
6	37+170	LHS	
7	37+430	LHS	
8	37+620	LHS	
9	39+320	RHS	

0.13.2 School Details

7 Schools exist on the project road and details of schools are presented in **Table below**.

Table 0.13 : Details of Schools

Sl. No.	Existing Chainage (Km)	Side	Name of School	Remarks
1	32+550	RHS	Lalcherra School Kadamtala	
2	33+560	RHS	Dakshin Jalaibari School	
3	34+850	LHS	-	
4	35+120	LHS	-	
5	37+450	LHS	Kadamtala Higher School	
6	40+350	LHS	Bhagan Higher School	
7	41+450	LHS	Jherjheri JB School	

0.13.3 Pond Details

4 no. of Ponds exist along the project road alignment and details of Ponds are presented in **Table below**.

Sl. No.	Design Chainage	Pond Length (m)	Side	Remarks
1	28+980	30	RHS	
2	32+160	40	RHS	
3	33+030	20	RHS	
4	33+960	10	LHS	

Table 0.14: Details of Pond

0.14 Railway Track& Proposals

No any railway track is falling on the Project road section.

0.15 Submergence Areas:

This is the rolling terrain in maximum length so to avoid the alignment to be submerge, embankment in fill of 1.5m (minimum) is proposed

0.15 Cross Drainage Works

0.15.1 Bridges

Total **05 minor bridges** are **falling in this section of Project road**.

- **all existing bridges are proposed for retained due to proposal of bypass,**
- **05 new minor bridges** are **proposed** in r**ealignment/bypass** sections.

Table 0.15: Proposal of Existing Bridges

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Number of Spans	Span Arrangement (Expansion Joint to Expansion Joint) (m)	Clear road way width between Kerbs (m)	Width of Footpath (m)	Proposal	
							Proposal	Remarks
1	29+375	-	1	35	7.7	1.8	Retained Due to Realignment/ Bypass	
2	29+950	-	3	58	7.5	1.5	Retained Due to Realignment/ Bypass	
3	30+650	-	2	11.9	10.9	-	Retained Due to Realignment/ Bypass	
4	31+450	-	2	18	10.9	-	Retained Due to Realignment/ Bypass	
5	35+675	-	2	17.9	11	-	Retained Due to Realignment/ Bypass	

- ***Additional Bridges Proposal***

Table 0.16: Proposal of Additional Bridges

Sl. No.	Design Chainage (Km)	Proposal			
		Proposal	Type of Structure	Width of Bridges (m)	Span Arrangement (m)
1	25+810	New Bridge	RCC Slab	16	1X10
2	26+870	New Bridge	RCC Slab	16	2X25
3	27+600	New Bridge	RCC Slab	16	1X15
4	28+000	New Bridge	RCC Slab	16	1X10
5	31+740	New Bridge	RCC Slab	16	1X15

0.15.2 Culverts

Total **43** culverts are falling in this section of existing Project alignment

- **all existing culverts** are proposed to **retained** due to avoided this section by proposal of **realignment/bypass.**

- **27 no. of additional culverts** are **proposed** as balancing culverts.

Table 0.17 : Proposal of Existing Culverts

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure (Pipe/SIab /Box /Arch)	Existing Details			Proposal
				No	Vent Width (m) (Clear)	Carriageway Width (m)	
1	28+250	-	SLAB	1	1.9	5.4	Retained
2	28+350	-	SLAB	1	3.2	5.2	Retained
3	28+750	-	PIPE	1	1	5.6	Retained
4	28+750	-	SLAB	1	3	5.6	Retained
5	28+800	-	PIPE	2	1	5.5	Retained
6	28+900	-	PIPE	2	1	5.6	Retained
7	29+200	-	PIPE	1	1	5.6	Retained
8	29+600	-	SLAB	1	3	5.5	Retained
9	29+700	-	PIPE	1	1	5.6	Retained
10	29+800	-	PIPE	1	1	5.6	Retained
11	30+850	-	PIPE	2	1	5.5	Retained
12	30+950	-	PIPE	1	1	5.5	Retained
13	31+050	-	PIPE	1	1	5.5	Retained
14	31+100	-	PIPE	1	1	5.5	Retained
15	33+400	-	PIPE	1	1	5.5	Retained
16	33+500	-	PIPE	1	1	5.2	Retained
17	33+900	-	PIPE	1	1	5.5	Retained
18	34+050	-	PIPE	1	1	5.4	Retained
19	34+150	-	PIPE	1	1	5.3	Retained
20	34+600	-	PIPE	1	1	5.6	Retained
21	35+250	-	PIPE	1	1	5.8	Retained
22	35+750	-	PIPE	1	1	6.3	Retained
23	35+800	-	PIPE	1	1	5.3	Retained
24	35+900	-	PIPE	1	1	5.9	Retained
25	36+250	-	PIPE	1	1	5.6	Retained
26	36+450	-	PIPE	1	1	5.6	Retained
27	36+700	-	PIPE	1	1	6.3	Retained
28	37+800	-	SLAB	1	1.2	5.5	Retained
29	37+950	-	PIPE	1	1	5.6	Retained
30	38+300	-	PIPE	1	1	5.8	Retained
31	38+750	-	PIPE	1	1	5.8	Retained

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Type of Structure (Pipe/SIab /Box /Arch)	Existing Details			Proposal
				No	Vent Width (m) (Clear)	Carriageway Width (m)	
32	38+850	-	PIPE	1	1	5.6	Retained
33	39+050	-	PIPE	1	1	5.7	Retained
34	39+650	-	SLAB	1	0.5	5.7	Retained
35	39+800	-	PIPE	1	1	5.4	Retained
36	40+050	-	PIPE	1	1	5.4	Retained
37	40+150	-	BOX	1	1	5.6	Retained
38	40+700	-	PIPE	2	1	5.6	Retained
39	40+800	-	PIPE	1	1	5.3	Retained
40	40+900	-	PIPE	2	1	5.7	Retained
41	41+200	-	PIPE	2	1	5.5	Retained
42	41+750	-	PIPE	1	1	5.4	Retained
43	41+800	-	PIPE	1	1	6	Retained

The details of Additional Culverts

Table 0.18 : Proposal of Additional Culverts

Sl. No.	Design Chainage (Km)	Proposal	
		Size (m)	Type of Structure
1	25+460	1x2x3	New Culvert
2	25+850	1x2x3	New Culvert
3	26+240	1x2x3	New Culvert
4	26+800	1x2x2	New Culvert
5	27+300	1x2x2	New Culvert
6	27+840	1x2x3	New Culvert
7	28+800	1x2x2	New Culvert
8	29+160	1x2x2	New Culvert
9	29+460	1x2x2	New Culvert

Sl. No.	Design Chainage (Km)	Proposal	
		Size (m)	Type of Structure
10	29+860	1x2x3	New Culvert
11	30+200	1x2x2	New Culvert
12	30+540	1x2x2	New Culvert
13	30+900	1x2x2	New Culvert
14	31+340	1x2x3	New Culvert
15	31+640	1x2x3	New Culvert
16	31+900	1x3x4	New Culvert
17	32+740	1x2x3	New Culvert
18	33+140	1x2x2	New Culvert
19	33+460	1x2x2	New Culvert
20	33+820	1x2x2	New Culvert
21	34+200	1x2x2	New Culvert
22	34+520	1x2x2	New Culvert
23	34+860	1x2x2	New Culvert
24	35+150	1x2x2	New Culvert
25	35+400	1x2x2	New Culvert
26	35+650	1x2x3	New Culvert
27	36+260	1x2x3	New Culvert

0.15.3 Bus Lay Byes

4 Bus bays & shelters are proposed along the Project road, The Locations are –

Table 0.19:- Bus Bays

Sl. No	Design Chainage (Km)	Side	Remarks
1	30.6	LHS	
2	30.9	RHS	
3	35.7	LHS	
4	36.0	RHS	

0.15.3 Truck Lay Bye

One truck lay bye is proposed in this section at design km 32.150.

0.15.4 Toll Plaza

No Toll plaza is proposed.

0.16 Proposed Bypasses / Realignments

Dharmanagar bypass & Kadamtala bypass are proposed in this section of Project road.

1. **Dharmanagar Bypass**

The Project road is passing through a major dense built-up i.e. **"Dharamanagar"**, a bypass is proposed for this town, Length of this bypass is 14.05 km on LHS, this alignment has been presented in HQ, NHIDCL, New Delhi on 28.05.2018 and has been approved.

5.700 km out of 14.05 km length covers in this section of Project road.

The view Dharmanagar bypass is as shown below –

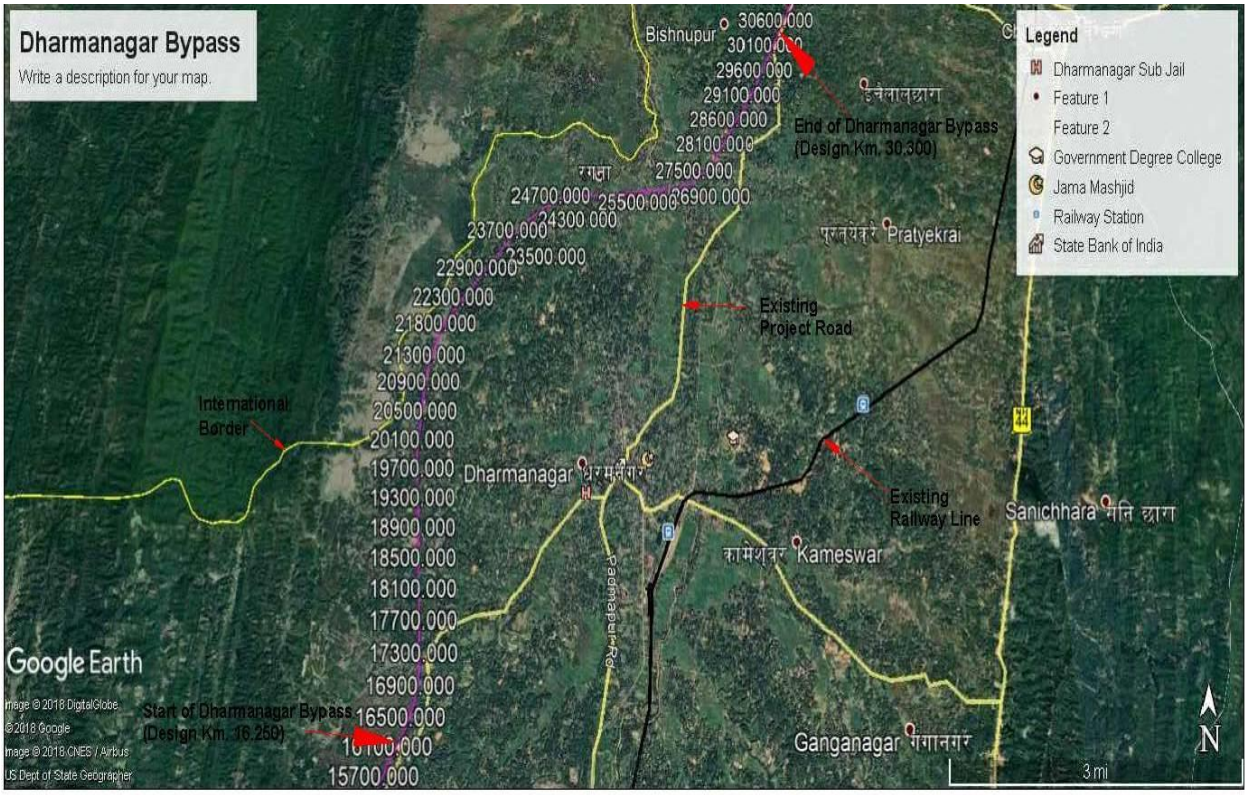


Figure 0.3 : Dharamnagar Bypass

1. **Kadamtala Bypass**

   For improvement of geometry and avoid congestion of traffic in "Kadamtala" town, a bypass is proposed for this town, Length of this bypass is 4.46Km on LHS, (approved option on 28.05.2018 at HQ, NHIDCL New Delhi) and merges in Project road near to end point ie. Kurti bridge.

   The view of Kadamtala bypass option is as shown below –

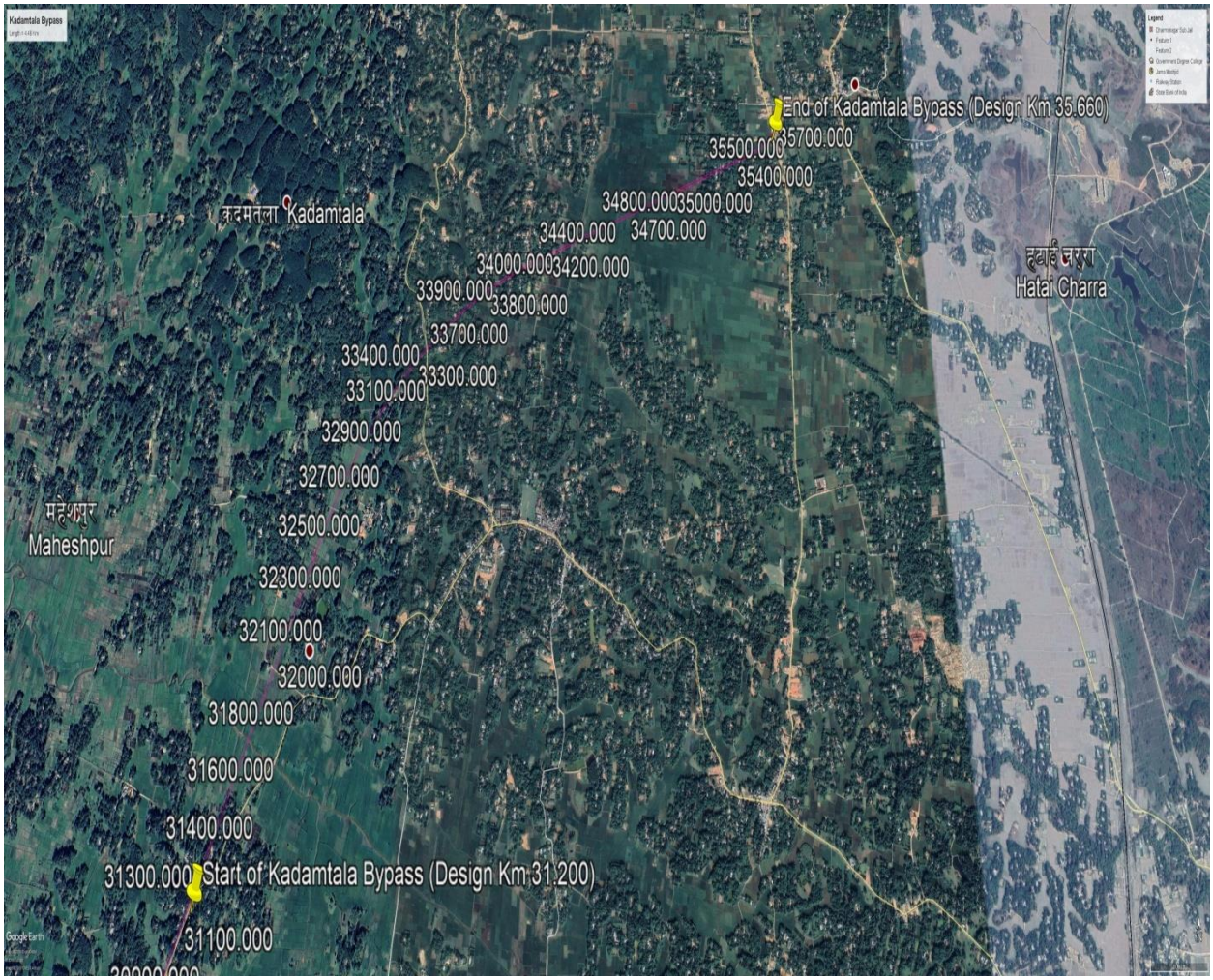


Figure 0.4: Kadamtala Bypass

0.17 Protection Works

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

a) Breast walls -

1	Breast Wall 1m height	240	280	520
2	Breast Wall 2m height	0	0	0
3	Breast Wall 3m height	0	0	0
4	Breast Wall 4m height	0	0	0
		240	**280**	**520**

The chainage wise details of Breast wall is presented in Vol. 9:: Bill of Quantity

b) Retaining Wall- Retaining wall is proposed in 1325m length along the pond side, high embankment etc. the chainage wise details of retaining wall is presented in Vol. 9 :: Bill of Quantity

c) W-Beam crash Barrier- W- Beam crash barrier is proposed in 5940m length (Where height of embankment is more than 3.0m), The chainage wise detail of W-Beam crash barrier is presented in Vol. 9 :: Bill of Quantity

d) RCC Drain - RCC linear drain of 1m wide is provided in 1800m length on both side.

e) PCC Drain - NiL

The Details of above all protection works has been provided in Vol.9:: Bill of Quantity.

0.18 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 PPP.

0.19 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 PPP.

0.20 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 PPP.

0.21Safety

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,

0.22 Utilities

The collection of estimate for relocation of utility shifting from concerned departments is in progress and will be submitted immediate after obtaining it.

0.23 Land Acquisition

The alignment is passing through Plain, rolling & Hilly terrain; the calculation of land acquisition area is approximate 32.852 hectare, the tentative cost of land acquisition has been considered **Rs 40.63 Crs.**

The details of adjacent land of projected road is presented below, the details may change after got confirmation/ joint site visit with revenue/ forest department.

Table 0.21 : Type of Land

Sl. No	Design Chainage (km)		Length (Km)	Type of Land	
	From	To		LHS	RHS
1	25.250	36.460	11.210	Private Land	

0.24 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.

0.25 Cost Estimate

The details of the cost abstract are presented in **Tables 0.22 below –**

Bill No.	Description		Amount (in RS)	Amount (in Crores)	%age of Civil Cost
	Design Length in Km	11.210			
1	Site Clearance and Dismantling		869911.00	0.09	0.11%
2	Earth Work		54511211.00	5.45	6.99%
3	Sub base and Base Course		169041971.00	16.90	21.66%
4	Bituminous Courses		185073414.00	18.51	23.72%
5	Bridges		185655544.00	18.57	23.79%
6	Culverts		70333987.00	7.03	9.01%
7	Drainage and Protection Works		72064050.00	7.21	9.24%
8	Traffic Signs, Marking and Appurtenances		1709249.00	0.17	0.22%
9	Bus Bays		5995495.54	0.60	0.77%
10	Junctions		31699285.95	3.17	4.06%
11	Truck Lay Bye		2611392.27	0.26	0.33%
12	Miscellaneous Items		770000.00	0.08	0.10%
A	Civil Cost (sum of 1 to 12)		780335510.76	78.03	
B	** GST on 'A' @ (Total 12%, 6% as VAT + 6% GST)	6.00%	46820130.65	4.68	
C	Civil Cost including GST (A+B)		827155641.41	82.72	
	Cost per km		73787300.75	7.38	
D	Contingencies charges on 'C' @	2.80%	23160357.96	2.32	
E	Sub Total (C + D)….		850315999.37	85.03	
F	Maintenance for 5 years (0.25%+0.25%+0.5%+0.5%+1%) on 'C"	2.50%	20678891.04	2.07	
G	escalation (5% per year for two years) on 'C' @	10.00%	82715564.14	8.27	

Bill No.	Description		Amount (in RS)	Amount (in Crores)	%age of Civil Cost
H	Construction Supervision Charges on 'C' @	3.00%	24814669.24	2.48	
I	Agency (NHIDCL) Charges on 'E' @	3.00%	25509479.98	2.55	
J	**Total Project Cost (E to I)**		**1004034604**	**100.40**	
K	Approx cost of Land Acquisition		406345453.16	40.63	
L	Approx Cost of Utility Shifting		44900000.00	4.49	
M	**Total Project Cost (J to M)**		**1455280057**	**145.53**	

0.26 Economic Analysis -

The consultants carried out the economic appraisal using the appraisal methodology and economic costs and benefits described in the preceding paragraphs of this report.

0.26.1 Base case

Derivation of passenger time costs always remained controversial issue, especially in respect of developing nations as saving in leisure time is mostly not appreciated that constitute majority except for commercially developed urban centres. Economic analysis for the base case has therefore, been carried out without considering the benefits on account passenger time savings.

0.27 Sensitivity Analysis

Two critical factors could affect the viability of the project and these are the Capital Cost and traffic level. The capital cost can increase or the expected traffic growth could not materialize or both factors could occur simultaneously sensitivity check using the following parameters has been carried out:

Sensitivity Option S1 Increase in base costs by 15%

Sensitivity Option S2 Decrease in base benefits by 15%

Sensitivity Option S3 Increase in base costs by 15% and decrease in base benefits by 15%

The EIRR and NPV (at 12%) for each link and section along with sensitivity analysis have been presented as follows:

Table 0.23 - Summary of Sensitive Analysis

Link ID	Design Length (km)	NPV (Million) @12%, Base Case	Economic Internal Rate of Return (%)			
			Base Case	Sensitivity S1	Sensitivity S2	Sensitivity S3
ESRR	11.210	2485	42.2%	38.9%	24.7%	16.4%

The project road is found to be economically viable with EIRR more than the resource cost of capital @ 12%.

0.27.1 Financial Analysis -

Based on the project structure, study of all possible sources of revenue, financial feasibility analysis has been carried out as per the methodology outlined in earlier sections. The objective of the financial analysis is to ascertain the existence of sustainable project returns, which shall successfully meet the expectations of its financial investors. The analysis reveals various FIRR values corresponding to each year of operation. FIRR for the Returns on Investment and Returns on Equity for the years from 2017 and 2034 (concession period 15 years including 2 years construction period) for the following alternatives with varying subsidy options are: -

Alternative I : With Nil Grant.

Alternative I ; With 40%. Grant

With the above mention options financial analysis has been carried out for 15 years concession period when grant is 40% of the Capital Cost. The results are given below in Table 0.24 for concession period 15 years are as under.

Table 0.24- Summary of Financial Analysis

Scenario	Pre tax FIRR %	Returns on Equity%	Post tax FIRR%	DSCR
Alternative- I	1.20%	-1.17%	1.08%	0.22
Alternative- II	4.84%	3.02%	4.45%	0.42

0.27.2 Conclusion

As it is clear from the results of the both the alternatives that the project is financially not viable even with 40% Grant. This is because of high cost of Construction and very low toll able traffic. **Therefore it is strongly recommended to construct the road on EPC basis and not on BOT basis.**

Centre Line Co-ordinates -

Table 0.25 – Centre Line Co-Ordinates

Chainage	X	Y	Chainage	X	Y
25240	413660.573	2700246.386	26260	414664.165	2700398.191
25260	413679.243	2700253.557	26280	414684.117	2700399.573
25280	413697.992	2700260.520	26300	414704.069	2700400.955
25300	413716.817	2700267.275	26320	414724.022	2700402.338
25320	413735.715	2700273.820	26340	414743.974	2700403.720
25340	413754.686	2700280.154	26360	414763.926	2700405.102
25360	413773.725	2700286.278	26380	414783.878	2700406.485
25380	413792.831	2700292.189	26400	414803.830	2700407.867
25400	413812.002	2700297.888	26420	414823.782	2700409.249
25420	413831.235	2700303.374	26440	414843.735	2700410.632
25440	413850.528	2700308.645	26460	414863.687	2700412.014
25460	413869.878	2700313.702	26480	414883.639	2700413.396
25480	413889.283	2700318.543	26500	414903.591	2700414.779
25500	413908.741	2700323.169	26520	414923.543	2700416.161
25520	413928.248	2700327.578	26540	414943.495	2700417.543
25540	413947.804	2700331.770	26560	414963.448	2700418.925
25560	413967.405	2700335.744	26580	414983.400	2700420.308
25580	413987.049	2700339.501	26600	415003.352	2700421.690
25600	414006.734	2700343.039	26620	415023.304	2700423.072
25620	414026.456	2700346.358	26640	415043.256	2700424.455
25640	414046.214	2700349.458	26660	415063.209	2700425.837
25660	414066.006	2700352.338	26680	415083.161	2700427.219
25680	414085.828	2700354.997	26700	415103.113	2700428.602
25700	414105.679	2700357.437	26720	415123.065	2700429.984
25720	414125.555	2700359.656	26740	415143.017	2700431.366
25740	414145.455	2700361.654	26760	415162.969	2700432.749
25760	414165.376	2700363.430	26780	415182.922	2700434.131
25780	414185.315	2700364.988	26800	415202.874	2700435.513
25800	414205.265	2700366.397	26820	415222.826	2700436.896
25820	414225.217	2700367.779	26840	415242.778	2700438.278
25840	414245.169	2700369.162	26860	415262.730	2700439.660
25860	414265.122	2700370.544	26880	415282.682	2700441.043
25880	414285.074	2700371.926	26900	415302.635	2700442.425
25900	414305.026	2700373.309	26920	415322.587	2700443.807
25920	414324.978	2700374.691	26940	415342.539	2700445.190
25940	414344.930	2700376.073	26960	415362.491	2700446.572
25960	414364.882	2700377.456	26980	415382.443	2700447.954

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
25980	414384.835	2700378.838	27000	415402.395	2700449.337
26000	414404.787	2700380.220	27020	415422.348	2700450.719
26020	414424.739	2700381.603	27040	415442.300	2700452.101
26040	414444.691	2700382.985	27060	415462.252	2700453.484
26060	414464.643	2700384.367	27080	415482.204	2700454.866
26080	414484.596	2700385.750	27100	415502.156	2700456.248
26100	414504.548	2700387.132	27120	415522.108	2700457.631
26120	414524.500	2700388.514	27140	415542.061	2700459.013
26140	414544.452	2700389.897	27160	415562.013	2700460.395
26160	414564.404	2700391.279	27180	415581.965	2700461.778
26180	414584.356	2700392.661	27200	415601.917	2700463.160
26200	414604.309	2700394.044	27220	415621.869	2700464.542
26220	414624.261	2700395.426	27240	415641.822	2700465.925
26240	414644.213	2700396.808	27260	415661.774	2700467.307
27280	415681.726	2700468.689	28320	416644.471	2700791.029
27300	415701.678	2700470.072	28340	416659.220	2700804.537
27320	415721.630	2700471.454	28360	416673.741	2700818.289
27340	415741.582	2700472.836	28380	416688.032	2700832.281
27360	415761.535	2700474.219	28400	416702.087	2700846.509
27380	415781.487	2700475.601	28420	416715.903	2700860.970
27400	415801.439	2700476.983	28440	416729.476	2700875.659
27420	415821.391	2700478.366	28460	416742.802	2700890.572
27440	415841.343	2700479.748	28480	416755.878	2700905.705
27460	415861.295	2700481.130	28500	416768.700	2700921.054
27480	415881.248	2700482.513	28520	416781.265	2700936.614
27500	415901.200	2700483.895	28540	416793.568	2700952.382
27520	415921.151	2700485.294	28560	416805.607	2700968.352
27540	415941.091	2700486.832	28580	416817.378	2700984.521
27560	415961.007	2700488.660	28600	416828.886	2701000.878
27580	415980.890	2700490.820	28620	416840.218	2701017.358
27600	416000.734	2700493.310	28640	416851.502	2701033.871
27620	416020.534	2700496.131	28660	416862.786	2701050.384
27640	416040.284	2700499.282	28680	416874.069	2701066.897
27660	416059.979	2700502.761	28700	416885.353	2701083.410
27680	416079.613	2700506.568	28720	416896.636	2701099.923
27700	416099.181	2700510.702	28740	416907.920	2701116.436
27720	416118.677	2700515.161	28760	416919.203	2701132.949
27740	416138.097	2700519.945	28780	416930.487	2701149.462
27760	416157.434	2700525.051	28800	416941.770	2701165.976
27780	416176.683	2700530.479	28820	416953.054	2701182.489

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
27800	416195.839	2700536.227	28840	416964.337	2701199.002
27820	416214.896	2700542.294	28860	416975.621	2701215.515
27840	416233.850	2700548.677	28880	416986.904	2701232.028
27860	416252.694	2700555.376	28900	416998.188	2701248.541
27880	416271.425	2700562.387	28920	417009.471	2701265.054
27900	416290.036	2700569.710	28940	417020.754	2701281.567
27920	416308.522	2700577.342	28960	417032.038	2701298.081
27940	416326.879	2700585.280	28980	417043.321	2701314.594
27960	416345.101	2700593.524	29000	417054.605	2701331.107
27980	416363.182	2700602.070	29020	417065.888	2701347.620
28000	416381.119	2700610.917	29040	417077.172	2701364.133
28020	416398.906	2700620.061	29060	417088.455	2701380.646
28040	416416.538	2700629.500	29080	417099.739	2701397.159
28060	416434.011	2700639.232	29100	417111.022	2701413.672
28080	416451.319	2700649.253	29120	417122.306	2701430.186
28100	416468.457	2700659.562	29140	417133.589	2701446.699
28120	416485.421	2700670.155	29160	417144.873	2701463.212
28140	416502.206	2700681.029	29180	417156.156	2701479.725
28160	416518.808	2700692.181	29200	417167.440	2701496.238
28180	416535.221	2700703.609	29220	417178.723	2701512.751
28200	416551.442	2700715.308	29240	417190.007	2701529.264
28220	416567.466	2700727.277	29260	417201.290	2701545.777
28240	416583.288	2700739.510	29280	417212.574	2701562.291
28260	416598.903	2700752.006	29300	417223.857	2701578.804
28280	416614.309	2700764.760	29320	417235.140	2701595.317
28300	416629.499	2700777.769	29340	417246.424	2701611.830
29360	417257.707	2701628.343	30400	417811.629	2702507.336
29380	417268.991	2701644.856	30420	417821.229	2702524.882
29400	417280.274	2701661.369	30440	417830.828	2702542.428
29420	417291.558	2701677.882	30460	417840.427	2702559.974
29440	417302.841	2701694.396	30480	417850.026	2702577.520
29460	417314.125	2701710.909	30500	417859.625	2702595.065
29480	417325.408	2701727.422	30520	417869.224	2702612.611
29500	417336.692	2701743.935	30540	417878.823	2702630.157
29520	417347.975	2701760.448	30560	417888.422	2702647.703
29540	417359.259	2701776.961	30580	417898.021	2702665.249
29560	417370.542	2701793.474	30600	417907.620	2702682.795
29580	417381.826	2701809.987	30620	417917.219	2702700.341
29600	417393.109	2701826.501	30640	417926.819	2702717.887
29620	417404.393	2701843.014	30660	417936.418	2702735.432

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
29640	417415.676	2701859.527	30680	417946.017	2702752.978
29660	417426.959	2701876.040	30700	417955.616	2702770.524
29680	417438.243	2701892.553	30720	417965.215	2702788.070
29700	417449.526	2701909.066	30740	417974.814	2702805.616
29720	417460.810	2701925.579	30760	417984.413	2702823.162
29740	417472.093	2701942.092	30780	417994.012	2702840.708
29760	417483.377	2701958.606	30800	418003.611	2702858.254
29780	417494.660	2701975.119	30820	418013.210	2702875.799
29800	417505.944	2701991.632	30840	418022.809	2702893.345
29820	417517.227	2702008.145	30860	418032.408	2702910.891
29840	417528.511	2702024.658	30880	418042.008	2702928.437
29860	417539.794	2702041.171	30900	418051.607	2702945.983
29880	417551.078	2702057.684	30920	418061.206	2702963.529
29900	417562.361	2702074.197	30940	418070.805	2702981.075
29920	417573.626	2702090.723	30960	418080.404	2702998.620
29940	417584.748	2702107.346	30980	418090.003	2703016.166
29960	417595.703	2702124.078	31000	418099.602	2703033.712
29980	417606.490	2702140.920	31020	418109.201	2703051.258
30000	417617.108	2702157.868	31040	418118.800	2703068.804
30020	417627.557	2702174.922	31060	418128.399	2703086.350
30040	417637.834	2702192.079	31080	418137.998	2703103.896
30060	417647.939	2702209.339	31100	418147.598	2703121.442
30080	417657.871	2702226.698	31120	418157.197	2703138.987
30100	417667.629	2702244.156	31140	418166.796	2703156.533
30120	417677.242	2702261.694	31160	418176.395	2703174.079
30140	417686.841	2702279.240	31180	418185.994	2703191.625
30160	417696.440	2702296.786	31200	418195.593	2703209.171
30180	417706.040	2702314.332	31220	418205.192	2703226.717
30200	417715.639	2702331.877	31240	418214.791	2703244.263
30220	417725.238	2702349.423	31260	418224.390	2703261.809
30240	417734.837	2702366.969	31280	418233.989	2703279.354
30260	417744.436	2702384.515	31300	418243.588	2703296.900
30280	417754.035	2702402.061	31320	418253.187	2703314.446
30300	417763.634	2702419.607	31340	418262.787	2703331.992
30320	417773.233	2702437.153	31360	418272.386	2703349.538
30340	417782.832	2702454.699	31380	418281.985	2703367.084
30360	417792.431	2702472.244	31400	418291.584	2703384.630
30380	417802.030	2702489.790	31420	418301.183	2703402.175
31440	418310.782	2703419.721	32480	418809.934	2704332.107
31460	418320.381	2703437.267	32500	418819.534	2704349.652

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
31480	418329.980	2703454.813	32520	418829.133	2704367.198
31500	418339.579	2703472.359	32540	418838.732	2704384.744
31520	418349.178	2703489.905	32560	418848.331	2704402.290
31540	418358.777	2703507.451	32580	418857.930	2704419.836
31560	418368.376	2703524.997	32600	418867.529	2704437.382
31580	418377.976	2703542.542	32620	418877.128	2704454.928
31600	418387.575	2703560.088	32640	418886.727	2704472.474
31620	418397.174	2703577.634	32660	418896.326	2704490.019
31640	418406.773	2703595.180	32680	418905.925	2704507.565
31660	418416.372	2703612.726	32700	418915.559	2704525.092
31680	418425.971	2703630.272	32720	418925.354	2704542.529
31700	418435.570	2703647.818	32740	418935.324	2704559.867
31720	418445.169	2703665.364	32760	418945.466	2704577.104
31740	418454.768	2703682.909	32780	418955.781	2704594.239
31760	418464.367	2703700.455	32800	418966.266	2704611.270
31780	418473.966	2703718.001	32820	418976.921	2704628.196
31800	418483.566	2703735.547	32840	418987.745	2704645.014
31820	418493.165	2703753.093	32860	418998.736	2704661.723
31840	418502.764	2703770.639	32880	419009.894	2704678.321
31860	418512.363	2703788.185	32900	419021.189	2704694.826
31880	418521.962	2703805.730	32920	419032.498	2704711.322
31900	418531.561	2703823.276	32940	419043.807	2704727.817
31920	418541.160	2703840.822	32960	419055.116	2704744.313
31940	418550.759	2703858.368	32980	419066.425	2704760.808
31960	418560.358	2703875.914	33000	419077.735	2704777.304
31980	418569.957	2703893.460	33020	419089.044	2704793.800
32000	418579.556	2703911.006	33040	419100.353	2704810.295
32020	418589.155	2703928.552	33060	419111.662	2704826.791
32040	418598.755	2703946.097	33080	419122.971	2704843.286
32060	418608.354	2703963.643	33100	419134.280	2704859.782
32080	418617.953	2703981.189	33120	419145.589	2704876.277
32100	418627.552	2703998.735	33140	419156.898	2704892.773
32120	418637.151	2704016.281	33160	419168.207	2704909.268
32140	418646.750	2704033.827	33180	419179.517	2704925.764
32160	418656.349	2704051.373	33200	419190.826	2704942.260
32180	418665.948	2704068.919	33220	419202.135	2704958.755
32200	418675.547	2704086.464	33240	419213.444	2704975.251
32220	418685.146	2704104.010	33260	419224.753	2704991.746
32240	418694.745	2704121.556	33280	419236.062	2705008.242
32260	418704.344	2704139.102	33300	419247.371	2705024.737

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
32280	418713.944	2704156.648	33320	419258.680	2705041.233
32300	418723.543	2704174.194	33340	419269.990	2705057.729
32320	418733.142	2704191.740	33360	419281.299	2705074.224
32340	418742.741	2704209.285	33380	419292.608	2705090.720
32360	418752.340	2704226.831	33400	419303.917	2705107.215
32380	418761.939	2704244.377	33420	419315.226	2705123.711
32400	418771.538	2704261.923	33440	419326.535	2705140.206
32420	418781.137	2704279.469	33460	419337.844	2705156.702
32440	418790.736	2704297.015	33480	419349.153	2705173.198
32460	418800.335	2704314.561	33500	419360.462	2705189.693
33520	419371.772	2705206.189	34560	420223.648	2705623.877
33540	419383.081	2705222.684	34580	420243.639	2705623.300
33560	419394.390	2705239.180	34600	420263.636	2705623.504
33580	419405.699	2705255.675	34620	420283.610	2705624.508
33600	419417.008	2705272.171	34640	420303.527	2705626.309
33620	419428.317	2705288.667	34660	420323.357	2705628.906
33640	419439.626	2705305.162	34680	420343.066	2705632.293
33660	419450.935	2705321.658	34700	420362.625	2705636.466
33680	419462.245	2705338.153	34720	420382.001	2705641.417
33700	419473.554	2705354.649	34740	420401.163	2705647.140
33720	419484.863	2705371.144	34760	420420.081	2705653.624
33740	419496.172	2705387.640	34780	420438.725	2705660.860
33760	419507.481	2705404.136	34800	420457.065	2705668.835
33780	419518.823	2705420.609	34820	420475.071	2705677.538
33800	419530.419	2705436.903	34840	420492.714	2705686.953
33820	419542.540	2705452.810	34860	420509.967	2705697.066
33840	419555.285	2705468.222	34880	420526.802	2705707.862
33860	419568.636	2705483.111	34900	420543.192	2705719.322
33880	419582.571	2705497.455	34920	420559.110	2705731.428
33900	419597.069	2705511.230	34940	420574.531	2705744.161
33920	419612.107	2705524.414	34960	420589.443	2705757.488
33940	419627.659	2705536.987	34980	420603.974	2705771.229
33960	419643.702	2705548.927	35000	420618.357	2705785.126
33980	419660.210	2705560.216	35020	420632.732	2705799.031
34000	419677.156	2705570.836	35040	420647.108	2705812.936
34020	419694.512	2705580.770	35060	420661.483	2705826.841
34040	419712.253	2705590.002	35080	420675.858	2705840.747
34060	419730.348	2705598.518	35100	420690.233	2705854.652
34080	419748.769	2705606.302	35120	420704.614	2705868.551
34100	419767.487	2705613.344	35140	420719.072	2705882.370

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
34120	419786.472	2705619.632	35160	420733.720	2705895.987
34140	419805.692	2705625.155	35180	420748.667	2705909.275
34160	419825.119	2705629.906	35200	420764.007	2705922.107
34180	419844.719	2705633.875	35220	420779.765	2705934.421
34200	419864.463	2705637.058	35240	420795.925	2705946.203
34220	419884.318	2705639.449	35260	420812.468	2705957.440
34240	419904.253	2705641.044	35280	420829.377	2705968.120
34260	419924.236	2705641.840	35300	420846.633	2705978.230
34280	419944.235	2705641.837	35320	420864.216	2705987.759
34300	419964.220	2705641.082	35340	420882.106	2705996.697
34320	419984.182	2705639.863	35360	420900.285	2706005.034
34340	420004.137	2705638.513	35380	420918.731	2706012.761
34360	420024.091	2705637.162	35400	420937.424	2706019.868
34380	420044.045	2705635.810	35420	420956.342	2706026.357
34400	420064.000	2705634.459	35440	420975.430	2706032.324
34420	420083.954	2705633.108	35460	420994.630	2706037.923
34440	420103.908	2705631.756	35480	421013.890	2706043.314
34460	420123.863	2705630.405	35500	421033.166	2706048.646
34480	420143.817	2705629.054	35520	421052.442	2706053.978
34500	420163.771	2705627.702	35540	421071.719	2706059.310
34520	420183.725	2705626.351	35560	421090.995	2706064.641
34540	420203.681	2705625.011	35580	421110.271	2706069.973
35600	421129.547	2706075.305	36040	421553.624	2706192.602
35620	421148.824	2706080.636	36060	421572.901	2706197.934
35640	421168.100	2706085.968	36080	421592.177	2706203.265
35660	421187.376	2706091.300	36100	421611.453	2706208.597
35680	421206.652	2706096.632	36120	421630.729	2706213.929
35700	421225.928	2706101.963	36140	421650.005	2706219.261
35720	421245.205	2706107.295	36160	421669.281	2706224.594
35740	421264.481	2706112.627	36180	421688.523	2706230.050
35760	421283.757	2706117.958	36200	421707.630	2706235.956
35780	421303.033	2706123.290	36220	421726.476	2706242.643
35800	421322.310	2706128.622	36240	421744.968	2706250.259
35820	421341.586	2706133.953	36260	421763.055	2706258.789
35840	421360.862	2706139.285	36280	421780.693	2706268.213
35860	421380.138	2706144.617	36300	421797.839	2706278.506
35880	421399.415	2706149.949	36320	421814.448	2706289.643
35900	421418.691	2706155.280	36340	421830.480	2706301.597
35920	421437.967	2706160.612	36360	421845.913	2706314.316
35940	421457.243	2706165.944	36380	421860.877	2706327.584

Consultancy services for 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**.

Package III: Kailashahar – Kurti Bridge [SectionI :: Design km 25.250 to 36.460]

Chainage	X	Y	Chainage	X	Y
35960	421476.519	2706171.275	36400	421875.603	2706341.117
35980	421495.796	2706176.607	36420	421890.289	2706354.693
36000	421515.072	2706181.939	36440	421904.975	2706368.269
36020	421534.348	2706187.270			