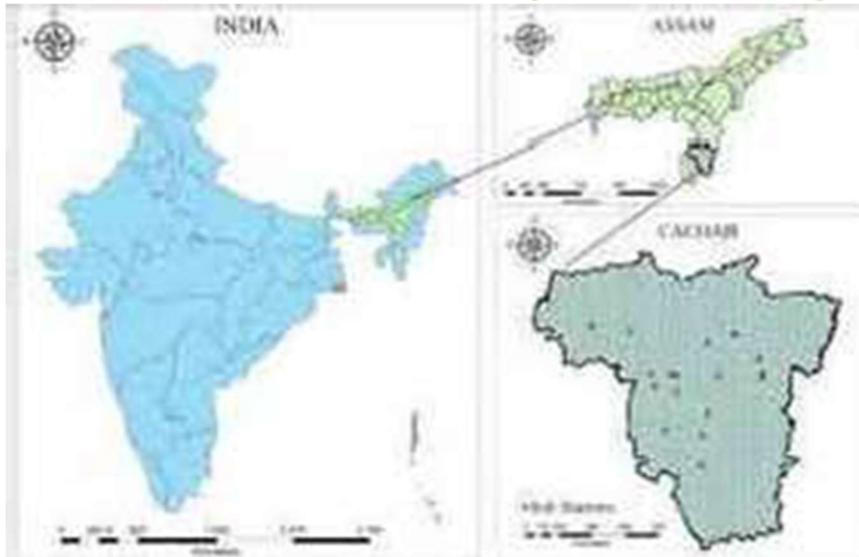


**National Highways & Infrastructure Development Corporation Ltd.**  
Consultancy Service for Preparation of Detailed Project Report and Providing Pre-Construction Activities for Construction of New NHs the Highway starting from its junction with NH-37 near Pailapool Connecting Jaipur, Harinagarm Kumarcherra, Zinam, Hagrum and Terminating at its Junction with NH-137 (Mahur-Tamenglong Road) in the state of Assam;



## **FINAL DETAILED PROJECT REPORT**

### **VOLUME I**

Executive Summary

#### **CLIENT:**

National Highways & Infrastructure  
Development Corporation Ltd.



#### **CONSULTANT**



M/S MSV INTERNATIONAL INC.  
IN ASSOCIATION WITH  
DESIGN LINE CONSULTANCY  
SERVICES GURUGRAM-HR.



“Consultancy Services for Preparation of DPR of New Highway NH-137G starting from its junction with NH-37 near pailapool connecting Joypur, Harinagar, Kumarcherra, Zinam, Hangrum and terminating at its junction with NH- 137(Mahur- Tamenglong Road) in the state of Assam on HAM basis. Executive Summary

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## **Chapter 0 - Executive Summary**

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## 0 Chapter 0 - Executive Summary

### 0.1 The Consultancy Services

The proposed NH-137G corridor is a highway project notified via Gazette Notification No. **S.O. 3987(E) dated 27/09/2021**, and traverses from Pailapool, NH-37 junction through Joypur, Harinagar, Kumacherra, Zinam, Hangrum, and terminates at its junction with NH-137 near P. Songkai village in the State of Assam.

### 0.2 Project Background and Objectives

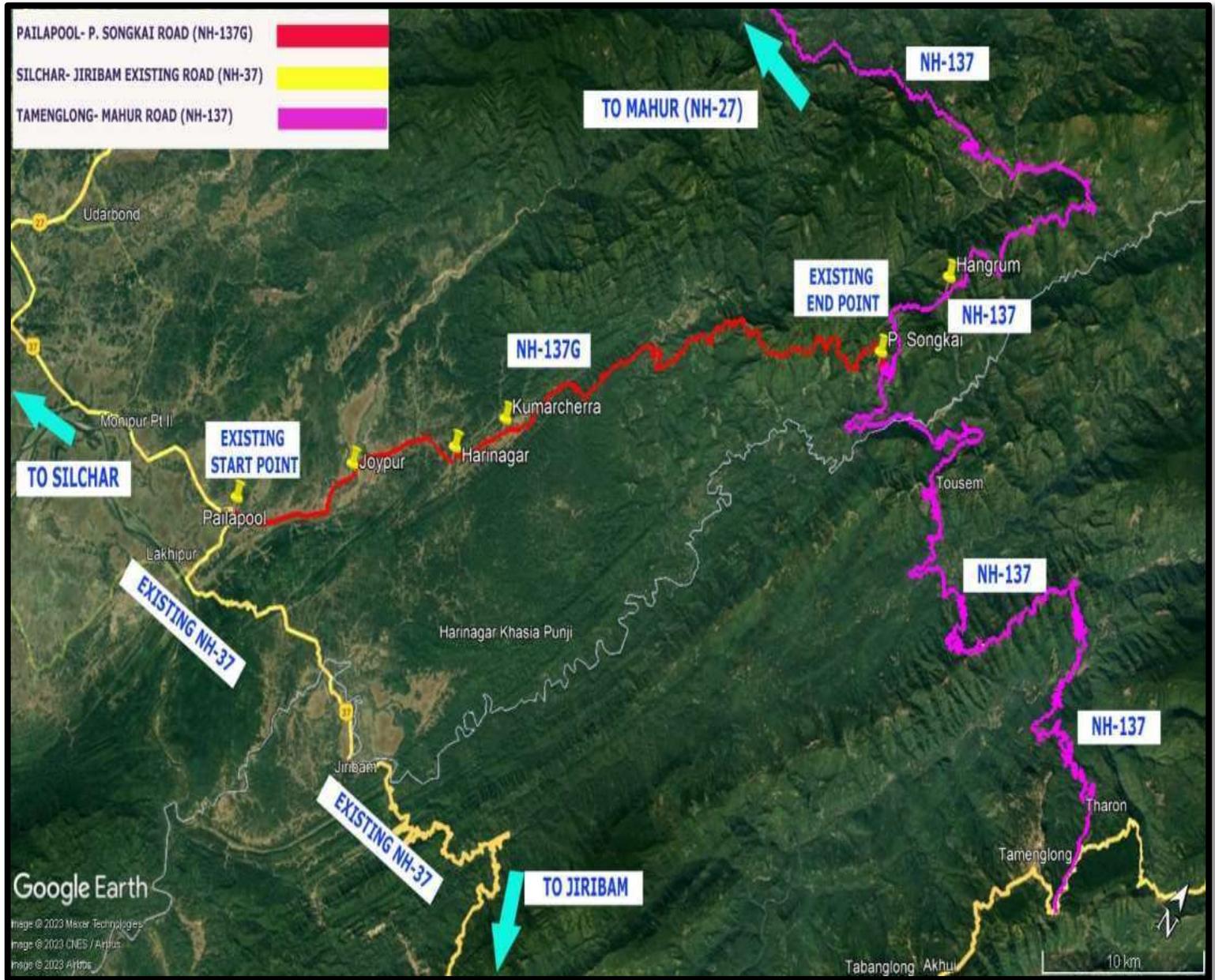
The proposed NH-137G alignment strategically aims to establish a direct and reliable connection between National Highway (NH-37), a major arterial route in Assam, and NH-137 (Mahur-Tamenglong Road) in the Dima Hasao district. This new link, originating from its junction with NH-37 near Pailapool and terminating at NH-137 near P. Songkai village, is envisaged to serve as a vital regional corridor enhancing inter-district and interstate connectivity between southern Assam and adjoining areas of Manipur. The alignment facilitates seamless integration to the Barak valley, thereby reducing travel distance/time, improving logistics efficiency, and ensuring year-round accessibility.

Moreover, the corridor will cater to underserved tribal and hilly areas by fostering socio-economic development, improving mobility, and supporting national security logistics due to its proximity to the international border and sensitive zones. By linking NH-37 and NH-137, the project ensures a continuous, multi-modal transport network supporting both civilian movement and strategic operations.

The alignment falls in predominantly hilly terrain and is critical for providing enhanced connectivity to remote regions of Cachar and Dima Hasao districts. The alignment follows Plain/Rolling terrain from Km 0.000 - Km 21.100 and mountainous/steep Terrain from Km 21.100- Km 65.043. The route passes through ecologically sensitive and topographically challenging sections, especially the Jinam River Ghat area. Presently, the traffic volume is 2491 PCU (base year-2024) and projected traffic is 6609 PCU (year- 2054). The available Carriageway width of existing road is in the range 3m - 7m (BT) & 2m - 3m (E/R), in hilly areas.

Due to congestion in the 04 major towns of Pailapool, Joypur, Harinagar & Kumacherra, and steep terrains at hilly areas, adequate no. of bypasses/realignment (improving curves at hilly terrains) aggregating of about 24.06 km, need to be constructed through Greenfield in addition to upgradation of existing road as Brownfield 2-Lane with Paved Shoulder.

### 0.3 Project Road (Pailapool to P.Songkai)



**Fig 0.1 Section (Pailapool to P.Songkai)**

- a) The project area lies between Pailapool Village and P. Songkai Village of Assam. Pailapool is located in the Cachar district of Assam and P. Songkai is located in Dima Hasao district of Assam State of India. The project start  $24^{\circ}49'44.97''N$  and  $93^{\circ}1'22.58''E$  are the geo- coordinate of the Pailapool & End point of Project Road as per tor latitude  $25^{\circ}8'56.55''N$  and  $93^{\circ}18'29.62''E$ . The other surrounding state capitals from start point are Imphal 93.4 Km., Shillong 142.4 Km., Agartala 207.5 KM. The surrounding nearby villages and its distance

from Pailapool are Fulertal 2.8 KM, Bapurvita Jurigaon, Dhamar, Saktola, Faringapara, Chunari , Aolatoli , Rowkhowa. Pailapool village is located in Mahur sub-division of Dima Hasao district in Assam, India. It is situated 61km away from sub-district headquarter Mahur and 92km away from district headquarter Haflong. The nearest railway station to Pailapool is Jiribam which is located in and around 10.4-kilometer distance. Pailapool’s nearest airport is Silchar Airport situated at 15.7 KM distance.

- b) After reconnaissance survey and further discussion held with NHIDCL, the DPR consultant has revised the start point of the project road from Pailapool to P.Songkai section from Village near Pailapool at Design Ch. 0+00 (Ch. 20.800 of Silchar Jiribam Pkg-I, NH-37) to Village P. Songkai at Design Ch. 58+474 (Ch. 106+830 of Tamenglong- Mahur section of NH-137) near Hangrum (Length: 58.474 km) in the State of Assam under NH(O)-NE on HAM.

#### 0.4 Terrain

Terrain is classified by the general slope of the country across the highway alignment as per IRC: 73 and with these criteria the project Highway Road passes through mostly rolling and mountainous terrain.

The proposed green filed alignment falling under rolling terrain and mountainous /steep terrain. The details of the same is given below.

**Table 0.1 S u m m a r y of Terrain along Project Road**

Sl. No.	Proposed Chainage		Length (m)	Terrain
	From	To		
1	0+000	20+700	20.700	Plain/Rolling
2	20+700	58+342	37.642	Mountainous/steep

#### 0.5 Land use Pattern and Settlement along Project Road

Existing project road passes through plain/Rolling and mountainous/steep terrain at certain location. The alignment mostly passes through agricultural area, semi built-up, built-up areas and few stretches lying on hill cum forest area.

Major built-up areas along existing road are Joypur, Harinagar, Kumacherra, Zinam, Hangrum, and terminates at its junction with NH-137 near P. Songkai village in the State of Assam. The condition of existing pavement varies from good to fair. The detailed discussion about the project road is given in Chapter 2: Project Description.

#### 0.6 Road Geometry and Configuration

In order to arrive at a feasible option, alternatives were decided based on both horizontal design and an additional land requirement. Environmental, social perspective and safety parameters have also been considered while proposing the alignment. As far as geometric improvement is concerned, it includes the curve improvements, realignment at villages where ribbon development with substandard curves and inadequate land availability and bypass

proposal in case of town advancement and based on future traffic demand.

Existing road is passing through congested built-up areas at majority of the locations, clustered with commercial, residential and industrial activities on both sides of existing road. Besides the above, the appreciable movement of pedestrians crisscrossing the road is observed at these locations. Existing horizontal geometrics are not as per NH standard at many locations, which are required to be upgraded. The Existing ROW along the project road varies from 5m to 12 m as per PWD records. As the project road is 2 Lane Economic corridor, improving the geometry is not possible within the available ROW wherever there is reduced EROW and it would entail for the demolition of structures within the immediate vicinity of the existing road, more over this does not ensure the safety of the designed facility as it would be passing through the built up and congested sections. As the existing project road has significantly encountered with number of substandard/acute horizontal curves beside ribbon development, bypass options were studied. The proposed bypasses were critically examined / studied for individual built-up vs option of Green-field single alignment for entire stretch.

**Study was classified in to option as below,**

The detail of the same is given below. The most economical with minimum disturbance has been considered, which details of these improvements are given in subsequent sections and summary is presented below.

**Table 0.2 L i s t of Bypass Proposals.**

Sr. No.	From	To	Length(m)	Bypass Name
1	0	9450	9450	Joypur
2	12180	13880	1700	Joypur
3	13880	14350	470	Joypur
4	14750	17000	2250	Harinagr
5	17600	21490	3890	Kumacherra
6	27000	31520	4520	Jinam Bridge
	32000	33780	1780	Jinam Bridge
<b>Total Bypass Length</b>			<b>24060</b>	
<b>Total Existing Length</b>			<b>34282</b>	
<b>Total Project Length</b>			<b>58342</b>	

### **Project Alignment with Bypass**

The proposed NH-137G corridor is a highway project notified via Gazette Notification No. S.O. 3987(E) dated 27/09/2021, and traverses from Pailapool, NH-37 junction through Joypur, Harinagar, Kumacherra, Zinam, Hangrum, and terminates at its junction with NH-137 near P. Songkai village in the State of Assam.

The proposed NH-137G alignment strategically aims to establish a direct and reliable connection between National Highway (NH-37), a major arterial route in Assam, and NH-137 (Mahur–Tamenglong Road) in the Dima Hasao district. This new link, originating from its junction with NH-37 near Pailapool and terminating at NH-137 near P. Songkai village, is envisaged to serve as a vital regional corridor enhancing inter-district and interstate connectivity between southern Assam and adjoining areas of Manipur. The alignment facilitates seamless integration to the Barak valley, thereby reducing travel distance/time, improving logistics efficiency, and ensuring year-round accessibility.

Moreover, the corridor will cater to underserved tribal and hilly areas by fostering socio-economic development, improving mobility, and supporting national security logistics due to its proximity to the international border and sensitive zones. By linking NH-37 and NH-137, the project ensures a continuous, multi-modal transport network supporting both civilian movement and strategic operations.

The alignment falls in predominantly hilly terrain and is critical for providing enhanced connectivity to remote regions of Cachar and Dima Hasao districts. The alignment follows Plain/Rolling terrain from Km 0.000 - Km 21.100 and Hilly Terrain from Km 21.100- Km 65.043. The route passes through ecologically sensitive and topographically challenging sections, especially the Jinam River Ghat area. Presently, the traffic volume is 2491 PCU (base year-2024) and projected traffic is 6609 PCU (year- 2054). The available Carriageway width of existing road is in the range 3m - 7m (BT) & 2m - 3m (E/R), in hilly areas.

Due to congestion in the 04 major towns of Pailapool, Joypur, Harinagar & Kumacherra, and steep terrains at hilly areas, adequate no. of bypasses/realignment (improving curves at hilly terrains) aggregating of about 24.06 km, need to be constructed through Greenfield in addition to upgradation of existing road as Brownfield 2-Lane with Paved Shoulder.



**Fig.0.2 A p p r o v e d Field Alignment**

**0.7 Pavement Condition and composition of the Project Corridor**

The width of carriageway along the project highway is found Single Lane in 52.993km, Intermediate Lane in 11.75km and Two Lane with Paved Shoulder in 0.2km. The Bituminous surface has been found in 56.8 Kms along the Project road. The riding surface condition of existing carriage way is in general poor condition except few locations of Plain Terrain.

**0.8 Bridges and Structures**

There are total 20 nos. of existing bridges out of which 02 is major bridge, whereas the other 18 nos. are minor bridges along the existing road.

The Bridge across ChiriRiver in Joypur.

**0.9 Culverts**

The inventory data for the existing cross drainage structures, culverts and bridges, are given with details in Chapter 3: Analysis & Interpretation of Engineering Surveys and Investigations.

**Table 0.3 Summary of Culverts / Bridges / ROB/RUB/VUP/LC**

<b>Major Bridge</b>	<b>Minor Bridge</b>	<b>Slab Culvert</b>	<b>Hume Pipe Culvert</b>	<b>LC</b>
02 Nos.	18 Nos.	61 Nos.	159 Nos.	2 Nos.

**0.10 Road Junctions and Intersections**

There are 01 no existing major road junctions with NH / SH / MDR and 72 no's minor junctions with village/city roads along the existing road. All the junctions are abandoned as the proposed alignment is passing through green filed.

**0.11 Railway Level Crossings and ROBs**

There is no ROB along the existing road.

**0.12 Underpass and Overpass**

There is no ROB along the existing road.

**0.13 Right-of-way**

As per the records available with PWD NH division, the ROW in town/ built-up areas is presented in Table 2.6 of Chapter - 2.

**0.14 Traffic Studies**

There is mixed traffic plying on the Project Highway comprising of trucks, buses, cars, two wheelers, non-motorised vehicles, etc. 2 homogeneous sections tabulated below have been considered to know the traffic flow conditions as shown in the traffic report. The detailed survey location and traffic analysis is given in Chapter 4: Traffic studies and Demand forecast.

**Table 0.4 Details of Homogeneous Sections**

<b>Section</b>	<b>Homogenous Section</b>	<b>Chainage</b>		<b>Length (Km)</b>
		<b>From (Km)</b>	<b>To (Km)</b>	
Section	Pailapool to P.Songkai	0+000	65+043	65.043

The above homogeneous section is considered based on traffic pattern and type of state highways the project road is traversing.

In order to generate the essential inputs, various traffic surveys were organized on the project road. The surveys carried out with their location and period are:

Classified Volume Count (7 days)	-	2 Locations
Classified Volume Count (3 days)	-	1 Location
O-D Survey (1day)	-	2 Locations
Intersection Volume Count (16 hrs)	-	1 Locations
Axle Axle Load Survey (2 day)	-	2 Locations

*\* As per ToR, Classified Volume Count survey shall be conducted for 7 continuous days at minimum 3 locations. However, we have carried out 7 days CVC at 5 locations for the project sections ie Silchar-Vairengte, Vairengte- Sairnaga and Silchar-Jiribam. However, the traffic survey that is conducted for Silchar to Jiribam section is represented above.*

### **Traffic Volume and Composition**

The Annual Average Daily Traffic at different survey locations are presented below:

**AADT (PCU) shown above is combined traffic (Trough and local traffic) however, details discussion on same shall be referred in chapter 5 Traffic analysis and Demand forecast**

### **Growth Rates**

Using the growth rates relevant to (i) passenger vehicles and (ii) freight vehicles are calculated separately. The formulae and methods for passenger vehicles and freight vehicles are illustrated below:

#### **Passenger Vehicles**

The growth rates of population, per capita income and elasticity of transport demand in relation to the income have been used to estimate the growth rates, as suggested in the World Bank guidelines using the following formula: -

$$\text{Passenger Vehicles} \quad : \quad Tgr = ((1+Pgr)*(1+PCI gr)-1)*100^*E$$

Where,

Tgr = Traffic Growth Rate

Pgr = Population Growth Rate

PCI gr = Per Capita Income Growth Rate E =

Elasticity value

### Freight Vehicles

The forecast growth rates for trucks have been made by calculating the average growth rates of the core sectors of economy, viz., Agriculture, Industrial and mining sectors and by multiplying the projected growth rates of these sectors of the following elasticity factors for the different periods:

Freight Vehicles :  $Tgr = \textcircled{\ast} (Agr + NSDPgr) \times E \times 100$  Where,

Agr = Growth rate of agricultural sector

NSDPgr = Growth rates of industrial & mining sectors

The growth rates for different vehicle categories have been estimated as per the methodology outlined above and the adopted growth rate figures are presented in the following table.

### Projected Traffic

The assigned traffic is projected for the different homogeneous section from Silchar to Jiribam based on the above growth rates and the summary of projected traffic in PCUs is presented below;

**Table 0.5 Projected Traffic AADT in PCU**

Location	Total Design PCU's					
	Design PCU's- (Year 2024)	Design PCU's- (Year 2026)	Design PCU's - 5 Year (Year 2031)	Design PCU's - 10 Year (Year 2036)	Design PCU's - 10 Year (Year 2041)	Design PCU's - 10 Year (Year 2045)
Km. 10+500	1623	1827	2469	3353	4566	5849
Km. 50+400	1963	2208	2978	4036	5483	7010

#### 0.15 Pavement Design

Detailed study under "Chapter 5: Pavement Design" of Main Report, pavement options have been studied viz. 1) Flexible Pavement, 2) Flexible pavement with cement treated base (CTB) and cement treated sub-base (CTSB), 3) Reinforced Flexible pavement with geo-grid and 4) Rigid pavement.

As the proposed alignment is a new green filed alignment and in submerged area, DPR consultant has recommended Flexible pavement with Geo grid provision and the same has been used for arriving the cost.

The Flexible pavement with geogrid provision between WMM layer is designed for Main carriageways, Bus bay, Truck lay bye, Rest area and service road as well.

The summary of the recommended pavement thickness is given below;

**Table 0.6 Proposed Flexible pavement detail**

Pavement Design	Design Lane traffic loading (msa)	Effective Subgrade CBR for Design (%)	Thickness (mm) as per IRC:37-2018					Remarks
			Designation of the Pavement Layer					
			Bituminous Concrete (BC) with VG-40	Dense Bituminous Macadam (DBM) with VG-40	SAMI Layer	CTB base Layer	CTSB Layer Grading IV of Table 400-1	
<b>BC+DBM WMM +CTSB</b>	50	8.0	40	60		140	200	60 MM DBM has to be laid in single layer with $V_a=3.5\%$ and $V_{be}=11.50\%$ .

#### Thickness for Toll Plaza & Tunnel

Based on study under "Chapter 6: Pavement Design" of Rigid pavement is proposed for Toll Plaza portion and the details of proposed rigid pavement thickness is given in below table.

**Table 0.7 Summary of Pavement Type and Thickness for Toll Plaza and Tunnel portion**

SI No	Sections	Type of Pavement	Thickness
1	Toll Plaza and Tunnel portion	Rigid	PQC = 280 mm DLC = 150 mm GSB = 150 mm Subgrade = 500 mm

#### 0.16 Improvement Proposals

The details of the improvement proposals along the proposed road are discussed in chapter 7: Improvement Proposals however, the summary of the same is given in table below.

**Table 0.8 Summary of Improvement Proposals**

Sl. No.	Description	Unit	Total
<b>1</b>	<b>Alignment &amp; Geometrics</b>		
	Total Length	Km	58.342
	<b>Re-alignments</b>	Km	-
	<b>Green Field Alignment</b>		
	Green Field Alignment	Km	24.060
	<b>Total (Green Field Alignment)</b>	<b>Km</b>	<b>24.060</b>

Sl. No.	Description	Unit	Total
<b>2</b>	<b>Cross Section</b>		
	2-Lane Road	Km	58.342
<b>3</b>	<b>Bridges</b>		
	<b>Existing</b>	Nos	20
	Major	Nos	02
	Minor	Nos	18
	<b>New Bridges</b>	<b>Nos</b>	55
	a. Major Bridges	Nos	03
	b. Minor Bridges	Nos	53
<b>4</b>	<b>Culverts</b>		
	Existing Culverts	Nos	220
	Proposed Culverts	Nos	137
<b>5</b>	<b>Propose Major &amp; Minor Junctions</b>		
	Major Junction	Nos	At-Grade-02
	Minor Junctions	Nos	At-Grade-78
<b>6</b>	<b>Tunnel</b>	Nos	00
<b>7</b>	<b>Toll Plaza</b>	Nos	01
<b>8</b>	<b>Service/Slip Road (LHS/RHS)</b>	Km	00
<b>9</b>	<b>Rest Area</b>	Nos	00
<b>10</b>	<b>Grade Separator</b>		
	<b>VUP cum Bridge</b>	Nos	01
	<b>Vehicular Underpass (VUP)</b>	Nos	00
	<b>Light Vehicular Underpass (LVUP)</b>	Nos	00
	<b>Smaller Vehicular Underpass (SVUP)</b>	Nos	00
	<b>Railway over Bridge (ROB)</b>	Nos	00
<b>11</b>	<b>Bus Bay</b>	Nos	24
<b>12</b>	<b>Truck Lay bye</b>	Nos	1
<b>13</b>	<b>Protection Work</b>		

Sl. No.	Description	Unit	Total
16	% of Land Requirement for the Project (Length wise)	%	100.00
17	Pavement Design Life		
	Flexible	Year	20
	Rigid	Year	30
18	Traffic in MSA: Km 24+560 to Km 37+650	MSA	50
	Main Carriageway	MSA	50
	Slip Roads	MSA	20
	Service Roads	MSA	10
19	Pavement Type Proposed 1. Km 24+560 to Km 37+650	Flexible	Flexible -2L
	Existing Type	BT	
	<u>Proposed new 2 Lane (Main Carriageway) -8% CBR</u>	<b>Flexible</b>	
	BC(PMB/CRMB)	mm	40
	DBM (VG-40)	mm	60
	CTB	mm	140
	SAMI Layer		
	CTSB	mm	200
	Subgrade	mm	500
	<u>Service Road (CBR 6%)</u>	<b>Flexible</b>	
	BC(VG-30)	mm	40
	DBM (VG-30)	mm	70 for SR/CR & 95 for Slip Road
	WMM	mm	250
	Granular Sub-Base (GSB)	mm	200
	Subgrade	mm	500

### Geometric Design Standards

The entire project section passes through plain/rolling terrain. The design speeds as per IRC: SP: 73-2018, have been proposed as under:

**Table 0.9 Typical Cross Section element**

Plain and Rolling Terrain		Mountainous and steep Terrain	
Ruling	Minimum	Ruling	Minimum
100	80	60	40

Proposed Cross-sectional elements for the project road have been adopted as follows

#### Plain Section (As per MoRTH Circular dated 04.06.2024)

- 1) Carriage Way Width =7.0 m
- 2) Paved Shoulder Width =1.5 m
- 3) Earthen Shoulder Width= 1.0 m

#### **Formation Width of NH=12 m. (As per MoRTH Circular dated 04.06.2024)**

##### Hill Section

- 1) Carriage Way Width =7.0 m
- 2) Paved Shoulder Width =1.0 m
- 3) Earthen Shoulder Width= 0.5 m  
Extra 1m E/S

#### Major and Minor Bridges:

As the proposed alignment is passing through green field 2 no's of new Major and 4 no's of Minor bridges are provided where the proposed alignment crossed the river or Nala. The details of the same is given below

**Table 0.10 Summary of Proposed Bridges**

Existing		Proposed			Retained
Type	No.	New	Reconstruction	Widening	
Major Bridge	2	3	-	-	-
Minor Bridge	18	52	-	-	-

#### 0.17 Environment Screening

The main objectives of the study are: i) identify the impacts of the project improvement on environment and ii) alleviate the unsafe condition and congestion of the existing highway on

NH 37 by enhancing the capacity and quality of the road to the users in a sustainable and environment friendly manner.

MoEF, GoI, has enforced Environment (Protection) Act 1986 and Notification on Environmental Impact Assessment dated 14th September 2006 and subsequent amendments to avoid, mitigate and prevent the environmental impacts from project activities. The EIA Report is prepared in line with EIA Notification guidelines. The report attempts to identify, predict and communicate information on impacts of the proposed subproject on the environment along with mitigation and management measures for the indicated impacts

**Key Environmental Laws & Policies:**

The Constitutional Provisions like Article 48 and 51-A (g) and 74<sup>th</sup> Amendment to the Constitution serve as principal guidelines of environmental protection. Further Regulations, Acts, Policies applicable to sustainability and environmental protection are as follows.

- *EIA Notification, September 2006 & subsequent Amendments*
- *The Environment (Protection) Act, 1986*
- *The Water (Prevention and Control) Act, 1974*
- *The Air (Prevention and Control) Act, 1981*
- *The Indian Forest Act, 1927*
- *The Karnataka Forest Act, 1963*
- *The Forest (Conservation) Act, 1980 (as amended in 1988)*
- *The Forest Conservation Rules, 1981*
- *The Wildlife Protection Act, 1972*
- *The Hazardous Waste (Management and Handling) Rules, 1989*
- *Fly ash Notification, 2009*
- *The Ancient Monuments and Archaeological Sites and Remains Act 1958*
- *The Motor Vehicles Act 1988*
- *Public Liability Insurance Act, 1991*
- *Coastal Regulation Zones Act*
- *The Factories Act 1956*

The other guidelines and norms related to road construction by Indian Road Congress that help for environmental protection include, IRC: 104-1988, IRC: 36-1974, IRC: 10- 1961, IRC: 36-1970, IRC: 43-1972, IRC: 72-1978, IRC: 33-1982, etc.

**Baseline Environment:**

Information on baseline environment is collected from secondary sources of data for the macro environmental parameters like climate, physiography (geology and geomorphology), biological and socio-economic environment of the project influence area. The micro-environmental details within the Corridor of Impact (CoI) have been collected from primary source of data such as base maps prepared by reconnaissance survey, extrapolation of environmental features on the proposed design, tree enumeration, analysis for environmental attributes along the project road.

**Analysis of Alternatives:**

The existing National Highway NH-37 is being up-graded to 4/6 Lane standards. An alignment options were studied by providing realignments for improving the road geometrics and for smoothening the sharp curves and bypasses to avoid narrow and congested stretches of the project road along with green filed alignment option. Hence analysis has been done for provision of bypass and green filed alignment.

**Stakeholder Consultation:**

During the survey, informal and unstructured stakeholder consultations were conducted at DC office Silchar, the purpose of the surveys and salient features of the proposed project were explained to the stakeholders to gather their opinions and concerns regarding the project.

**Anticipated environmental impacts and mitigation measures:**

The key Environmental impacts, both direct and indirect on various environmental attributes during construction and operational phases of proposed NH improvement project are discussed in detail in the report. Significant positive and negative impacts due to project are summarized in the following impact matrix.

**Table 0.11 environmental impacts and mitigation measures**

Environmental Attributes	Physical Environment			Biological Environment		Geology		Topography
	Air	Water	Noise	Flora	Fauna	Natural Drainage	Soil	
<b>I. Construction Phase</b>								
Labour Camp Activities		-ve/t						
Quarrying	-ve/t		-ve/t	-ve/t		-ve/t	-ve/p	-ve/p
Material Transport & Storage	-ve/t	-ve/t	-ve/t	-ve/t		-ve/t	-ve/t	
Drilling and Blasting	-ve/t		-ve/t	-ve/t				-ve/p

Pavement works	-ve/t	-ve/t	-ve/t	-ve/t	-ve/t	<b>-ve/p</b>	-ve/t	<b>-ve/p</b>
Use of Construction Equipment	<b>-ve/t</b>	<b>-ve/t</b>	<b>-ve/t</b>					
Cutting of Trees				<b>-ve/p</b>				
Plantation	+ve/p		+ve/p	<b>+ve/p</b>			+ve/p	
Culvert and Bridge Construction		-ve/t	-ve/t			<b>-ve/p</b>		
Stripping of Topsoil				-ve/t		-ve/t	<b>-ve/t</b>	
Debris Generation	-ve/t	-ve/t				-ve/t	-ve/t	
Oil and Grease		-ve/t					-ve/t	
<b>II. Operational Phase</b>								
Vehicular Movement	+ve/p		+ve/t	+ve/t	-ve/p			

*Note: t - Temporary; p- Permanent; Impacts indicated in bold letters are Significant Impacts.*

#### **Environmental Management Plan:**

Environmental Management Plan (EMP) deals with the implementation procedure of the guidelines and mitigation measures recommended to avoid, minimize and mitigate foreseen environmental impacts of the project. The implementation of environmental management plan needs suitable organization set up and the success of any environmental management plan depends on the efficiency of the group responsible for implementation of the programme. It is proposed to carryout regular environmental monitoring to provide information to the management for periodic review to ensure that environmental protection is optimized at all stages of the project implementation.

#### **Conclusion:**

The proposed improvement to the existing National Highway section road and it is proposed to be up-graded with new.

The Environmental Assessment study nation report attempts to identify significant potential environmental impacts associated with the construction and operational phases of the proposed road Project. Apart from positive impacts road projects could also generate some adverse direct and indirect environmental impacts. Direct environmental impacts are usually due to construction activities, while indirect environmental impacts are usually related to the operation of improved roads.

Other than the temporary insignificant impacts during construction phase, the two most significant issues involved are cutting of road side trees along the proposed stretch of NH-37 and acquisition of forest land in the forest along the proposed green field alignment.

#### **0.18 Social Assessment**

Social Assessment details the processes for assessing the project's potential social impacts and

defining opportunities to enhance benefits and mitigate adverse social impacts. It contains the modalities for profiling socio-economic conditions, identifying stakeholder groups and analysing their interests and concerns, conducting social screening to assess potential impacts and linking these findings to project design. This will provide input for the Resettlement Action Plan, which will be prepared in due course.

### **Expected Socio-Economic Benefits of the Project**

The project will help to increase new economic and employment opportunities by providing improved linkages to markets, production centres and other areas of economic opportunities. The project is major transportation corridor which connects Silchar and Imphal. The road will increase the connectivity of the project area as well as the state as a whole to the surrounding region.

This project aims at maximizing project benefits while minimizing the negative social impacts. The social development outcome of the project will include:

- i) The project road connects Assam and Manipur. The proposed green filed alignment will serve the settlement along existing road with better access to economic activities. Improved connectivity will facilitate travel, will help to have better access to amenities such as health, education, town/market, and improved social networking.
- ii) The project will improve the accessibility of the population along the project corridor to education, health, employment, trading and employment opportunities and in the long run help towards poverty alleviation.
- iii) The project will help to increase new economic and employment opportunities by providing improved linkages to markets, production centers and other areas of economic opportunities. Better and quicker transportation would help the rural population to transport their produce faster and get more profit margins instead of depending solely on local 'markets and middlemen. This corridor has abundant tourism potential other places of tourist interests.
- iv) Women will benefit, as their mobility will be facilitated both in terms of access to social services, as well as access to higher levels of schooling. Women's access to higher levels of health care outside the village particularly during the time of childbearing will also improve considerably.
- v) Targeted assistance will be provided to vulnerable groups including below poverty line families, women headed households, and handicapped persons, through the Resettlement Policy for the Project.

The likely adverse impacts of the project are:

- i) Potential adverse impacts associated with land acquisition;
- ii) Loss of livelihood and
- iii) Social exclusion where the affected non-titleholder and encroachers may not be eligible for assistance and compensation under local laws and procedures

Overall, the proposed Project will bring in economic and social changes, which in turn would bring economic prosperity and would lead to poverty alleviation.

## Methodology

Collection and Analysis of Secondary Data: Secondary data pertaining to various socioeconomic parameters was collected from government departments like Census of India, Department of Industries, Department of Economics and Statistics, Department of Agriculture, etc.

Screening survey: A preliminary screening survey was conducted within a width of 45 meter to quantify the impact on buildings/structures that likely to be affected by the widening of the road. The number of residences, commercial buildings, common property resources and religious structures were surveyed for RHS and LHS separately. The survey covered: the settlements along the alignment, structures likely to be affected, community structures likely to be affected and communities affected.

Focused Group Discussions (FGD): Focus Group Discussions were conducted at selected places throughout the corridor to understand the people's perception about the project as well as their issues and concerns. The willingness of the people to part with their land for the project and the compensation anticipated also noticed.

## Task of the assignment

### The tasks of this assignment include:

- a) Carry out a preliminary social screening in coordination with other screening exercise (environment and technical) – desk review and field visit- of the highway to determine the magnitude of actual and potential impact and ensure that social considerations are given adequate weight in the selection and design of proposed highway improvements;
- b) Collect information – desk review and field visit – on existing baseline conditions (include all within the proposed width or Right of Way), and undertake a preliminary evaluation of the highway selected for improvement in order to define, the zone of impact of such component or activities, design and management studies;
- c) Explore viable alternative project designs and alignments to avoid, where feasible, or minimize displacement and carry out public consultations on alternate bypass alignments.
- d) Identify major and minor social impact issues and estimate the economic and social negative impacts on people and land of upgrading the highway and propose cost-effective measures to avoid and/or mitigate negative impacts;
- e) Identify case of likely impact on Indigenous communities, to establish the applicability of GOI/State Government regulation;
- f) Carry out public consultation with the likely affected groups, NGOs, district administration and other stakeholders and document the outcomes;
- g) Provide a preliminary cost estimate for land acquisition, transfer and resettlement and rehabilitation and ensure inclusion in the overall project cost;
- h) Assets both within and outside of the right of way such structures and land will be recorded on strip maps; and

## 0.19 Cost Estimates

The project cost has been worked out for civil works for main carriageway, Truck lay bye, Toll Plaza, bus bays and junction improvement with Flexible pavement. Project road length is considered as Pailapool to P. Songkai section- **2-Lane with paved shoulder of Existing Intermediate Lane of NH-137G from Village near Pailapool at Design Ch. 0+00 (Ch. 20.800 of Silchar Jiribam Pkg-I, NH-37) to Village P. Songkai at Design Ch. 58+342 (Ch. 106+830 of Tamenglong- Mahur section of NH-137) near Hangrum (Length: 58.342 km) in the State of Assam under NH(O)-NE on HAM.**

. The details are presented in the Volume VI, VII & VIII: Rate analysis and Cost estimate. The item - wise abstract of cost of Civil Works for this Package are given below.

**Table 0.12 Abstract of Cost Estimate**

S.No.	Items	Amount in Rs	Amount in Cr.	Remarks
1	<b>Civil Construction Cost</b>	7,26,75,22,280.00	726.75	<b>A1</b>
2	<b>Utility shifting cost</b>	23,52,81,662.00	23.53	<b>A2</b>
3	<b>Total Cost including Utility shifting</b>	7,50,28,03,942.00	750.28	<b>A=(A1+A2)</b>
4	<b>IC/ Pre-operative Expenses</b>	7,50,28,039.00	7.50	<b>B = 1% of A</b>
5	<b>Financing Cost</b>	4,00,00,000.00	4.00	<b>C = 0.75% of Debt Amount subject to minimum Rs. 4 Cr.</b>
6	<b>Interest during construction</b>	37,15,00,000.00	37.15	<b>D (as per Financial Model)</b>
7	<b>Estimated Project Cost (EPC)</b>	7,98,93,31,981.00	<b>798.93</b>	<b>E (ΣA:D)</b>
8	<b>GST@18%</b>	1,35,05,04,710.00	135.05	18% of A
9	Estimated Project Cost (EPC) with GST	9,33,98,36,691.00	933.98	
10	<b>Bid Project Cost (BPC)</b>	8,92,00,00,000.00	892.00	<b>F =As per Financial Model</b>
11	Bid Project Cost (BPC) with GST	10,52,56,00,000.00	1,052.56	
12	Contingencies	10,90,12,834.00	10.90	<b>G = 1.5% of A1 subject to minimum of Rs. 10 Cr.</b>
13	<b>Price Escalation during construction period</b>	<b>60,02,24,315.00</b>	60.02	<b>H =8%of A defined below</b>
14	<b>Maintenance charges including price escalation</b>	<b>1,19,83,99,797.00</b>	119.84	<b>I =15%of E defined below</b> <b>15 years Maintenance period (flexible pavement)</b>
15	<b>Interest on Annuity</b>	3,99,46,65,991.00	399.47	<b>J = 50% of E</b>
16	<b>GST</b>	<b>2,66,80,14,529.00</b>	266.80	<b>K = 18% of (F+G+H+I+J)</b>
17	Agency charges	11,25,42,059.00	11.25	<b>L = 1.5% of A subject to minimum Rs. 8 Cr and maximum of 12 Cr</b>

18	Supervision charges including GST	7,98,93,320.00	7.99	M = 1% of E
19	LA and other pre-construction charges	5,15,03,70,040.00	515.04	N
20	<b>Total Capital Cost</b>	<b>22,83,31,22,885.00</b>	<b>2,283.31</b>	<b>0 = (ΣF:N)</b>
	<b>Length of the project road (Km)</b>			<b>58.342 Km</b>
	<b>Civil Cost Rate per km (in Crores)</b>			<b>12.86 Cr.</b>
	<b>Total Capital Cost Rate per km (in Crores)</b>			<b>39.14 Cr.</b>



**"Consultancy Services for Preparation of DPR of New Highway NH-137G starting from its junction with NH-37 near pailapool connecting Joypur, Harinagar, Kumarcherra, Zinam, Hangrum and terminating at its junction with NH- 137(Mahur- Tamenglong Road) in the state of Assam on HAM basis. Executive Summary**

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