Oct. 2022

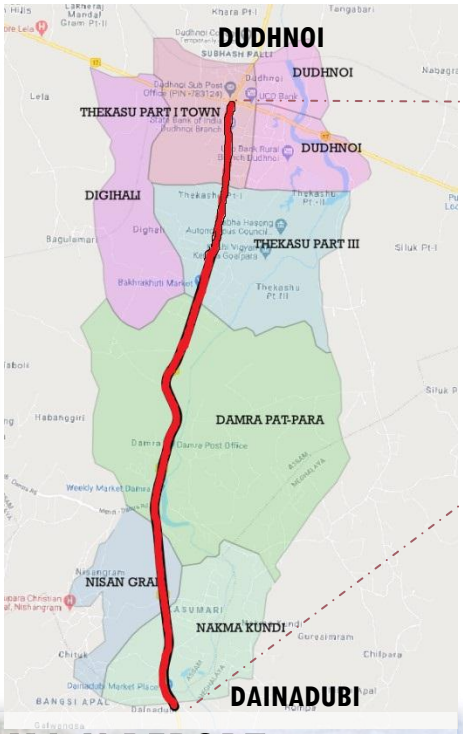
DRAFT DETAILED PROJECT REPORT

CONSULTANCY SERVICES FOR DEVELOPMENT OF ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOGANA LOT-1

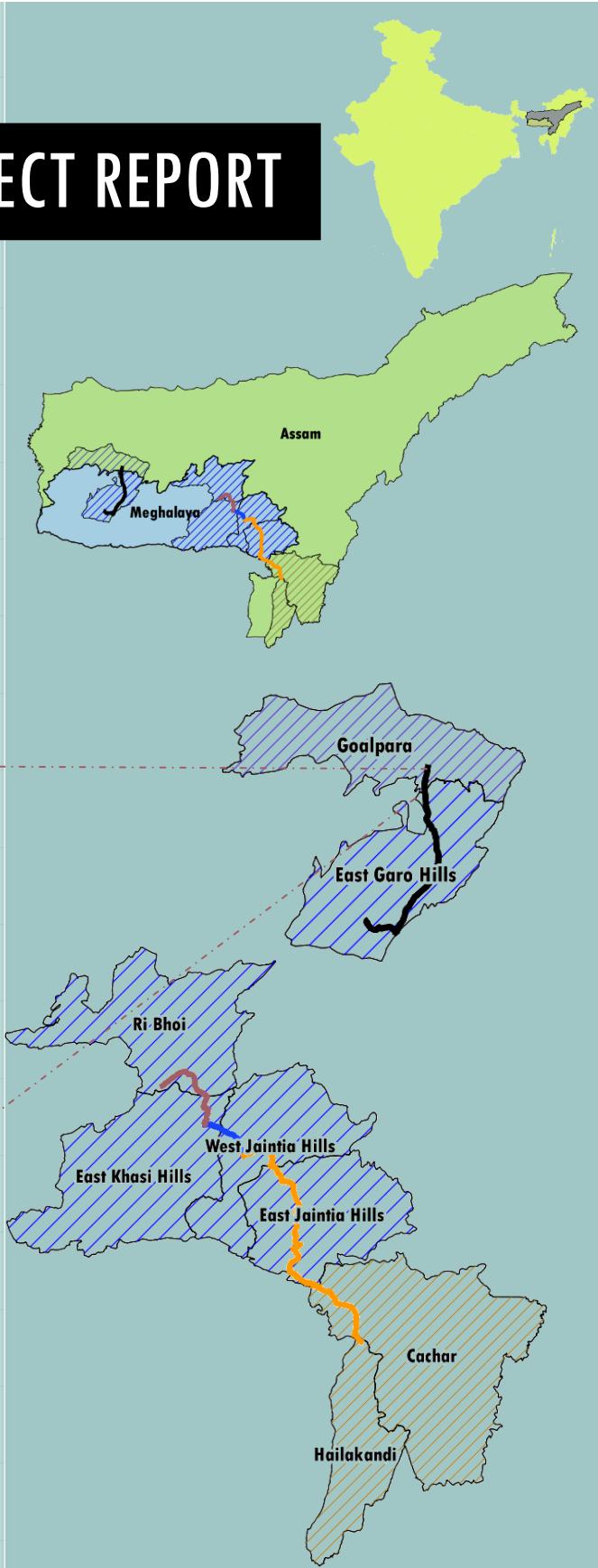
NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

DUDHNOI DAINADUBI

(ECONOMIC CORRIDOR – DUDHNOI WILLIAM NAGAR)



VOLUME 1: MAIN REPORT



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CHAPTER-1
INTRODUCTION

1.1 Project Background

The National Highways & Infrastructure Development Corporation Limited (NHIDCL) has been entrusted with the assignment for providing Consultancy services for preparation of DPR for Economic Corridors, Inter Corridors and Feeder Routes to improve the efficiency of freight movement in India under Bharatmala Pariyojna (Lot-01) in the State of Assam and Meghalaya for upgradation to Two/Four lane with paved shoulder configuration. The Consultancy Services for this project has been awarded to Global Infra Solutions in JV with Krishna Techno Consultants Pvt. Ltd. in association with Infycons Creative Software Pvt. Ltd.

The Letter of commencement for this assignment was issued by General Manager (Technical), National Highway & Infrastructure Development Corporation Limited, New Delhi vide their letter No. NHIDCL/Bharatmala/DPR/Phase-I/Lot-1/Package 1B/2017/106 dated 02-07-2018.

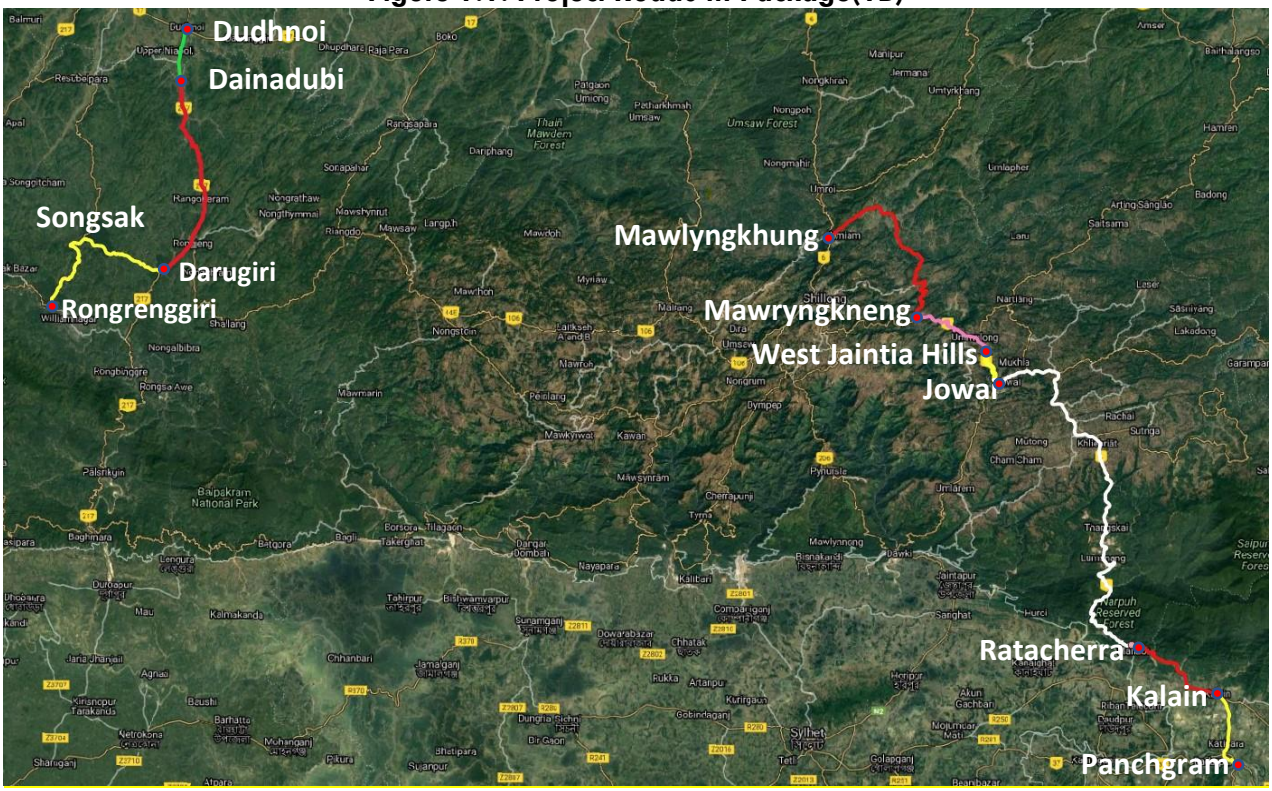
The name of the Project Highway as per RFP are (1) Dudhnoi-Damra (5 km), (2) Damra-Nengkra (66 km), (3) Nengkra-Williamnagar (16 km), (4) Mawlyngkhung-Mawryngkneng (49 km), (5) Jowai-Ratachera (101 km), (6) Ratachera-Kalain (25 km), (7) Kalain-Panchgram (16 km), (8) Mawryngkneng-West Jaintia Hills (19 km) and (9) West Jaintia Hills- Jowai (7 km) in the states of Assam and Meghalaya. The total length of the project highway is 304 km.

The Alignment has been changed into following since the commencement:

1. **Dudhnoi-Damra-Dainadubi (8.60Km.) with ref. Letter BO/SHG/P/BHM/GEN/1201 issued on 28.01.2019 extending the stretch to Dainadubi (PMU Bongaigaon, RO Guwahati).**
2. Dainadubi-Darugiri (43Km.) (PMU Tura, RO Shillong)
3. NH-127B Darugiri-Songsak-Rongrengiri (William Nagar Junction;39.06Km.) with ref. No. NHIDCL/RO-SHG/D-W/507/2021/821, dated 15.07.2021(PMU Tura, RO office Shillong).
4. Mawlyngkhung-Mawryngkneng (49 km)(PMU Mawkyrwat, RO office Shillong)
5. Mawryngkneng-West Jaintia Hills (19 km)(PMU Mawkyrwat, RO office Shillong)
6. West Jaintia Hills-Jowai (7 km)(PMU Mawkyrwat, RO office Shillong)
7. Jowai-Ratachera (101 km)(PMU Mawkyrwat, RO office Shillong)
8. Ratachera-Kalain (25 km) (PMU Silchar, RO office Guwahati).
9. Kalain-Panchgram (16 km) (PMU Silchar, RO office Guwahati).

An index Map of the project corridor is shown in Figure 1.1 Index Map.

Figure 1.1: Project Roads in Package(1B)



Note: - The Present Proposal is for **Dudhnoi-Dainadubi (NH-217)** Road from Design Ch. 0+000 to Ch. 8+415, Design Length -8+415 Km.

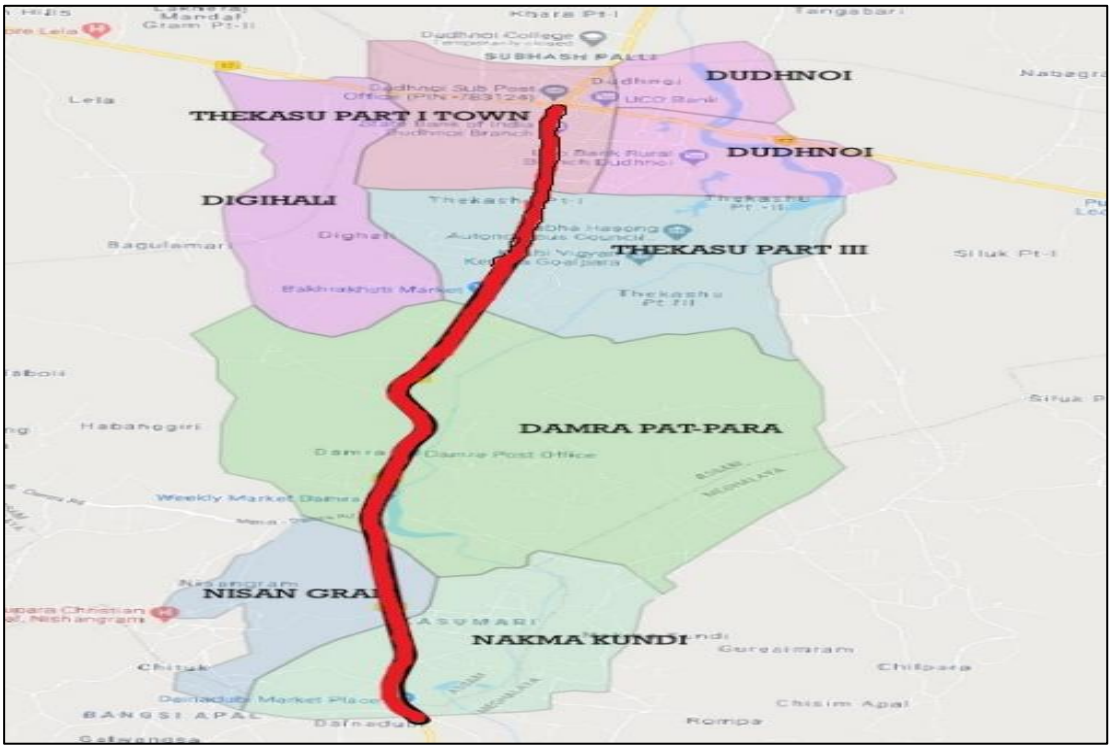
1.2 Project Brief and Project Roads

The name of the project highway is **"Dudhnoi-Dainadubi"**. It starts from its existing Km 0+00 of NH-217 and terminates at Dainadubi (km 8+415 Assam-Meghalaya State Border). Existing Length of Project Road is 8.415 km. However, the Design Length of the project section is 8+415 Km. The project section is a part of NH-217. The Projected Road lies in Goalpara District of Assam State and End at Meghalaya State border in East Garo Hills District of Meghalaya. Location is given in the **Table 1.1** below:

Table 1.1: Location of Project Roads

Sr. No	Existing Chainage		Design Chainage		Design Length (km)	Cordinates	
	From (km)	To (km)	From (km)	To (km)		Start	End
1	0+000	8+415	0+000	8+415	8.415	25°58'58.65"N & 90°46'56.20"E	25°54'33.23"N & 90°46'28.20"E
	Total Length (km)				8.415		

This report is on **Dudhnoi-Dainadubi**. Details of the existing features and improvement proposal considered are presented in this report.



1.3 Objectives of the Project

The main objective of the project service work is to establish the technical, economical, and financial viability of the project and prepare Feasibility and preparation of Detailed Project Report for Rehabilitation and up gradation of existing road to two/four lane with or without paved shoulders (as may be applicable) or higher configuration.

On completion and/ or during progress of the proposed services, the NHIDCL will be able to:

- Upgrade/ reconstruct/ widen as well rehabilitate selected roads;
- Carry out road safety enhancement work;
- Do planning, budgeting and program to strengthen the project highway, asset and Financial management;

Objectives associated with improvement proposal are following:

1. Decongestion of Existing NH-62 between project stretch
2. Remove Geometric constraints along existing road and providing smooth passage for traffic movement
3. Providing facilities to pedestrian/schools vicinity to reduce interaction of vehicles & persons on foot.
4. To propose all facilities along with maintaining economy at whole.

1.4 Scope of Services

The services will be undertaken in different parts and is broadly as below;

Part A: As far as possible, the widening/improvement work to two lanes with paved shoulders shall be within the existing right of way avoiding land acquisition. Special circumstances land acquisition can be made.

Part B: The Consultant shall study the possible locations and design of toll plaza (If any). Wayside amenities required on tolled highway shall also be planned.

Part C: The Consultants shall prepare documents for EPC contracts for each DPR assignment.

Part D: All ready to implement "good for construction" drawings shall be prepared.

Part E: Environmental Impact Assessment and Environmental Management Plan shall be carried out by the Consultant meeting the requirements of the Government of India

Part F: The consultant shall also suggest alternate traffic movement plan during construction

1.5 Organization of Detailed Project Report

The Draft Detailed Project Report has been presented in Nine Volumes to cover all the details on road design, social and environmental aspects etc. These are as follows:

VOLUME I: MAIN REPORT

Chapter 1 Introduction: this briefly discusses on the project and report structuring.

Chapter 2 Project Road Description: briefly describes salient features of project road.

Chapter 3 Engineering Surveys and Investigations: presents the details of surveys and investigations carried out on the project road, the results which will form input for the design.

Chapter 4 Socio-Economic Profile: discusses on project influence area, the socioeconomic setting, state economy, growth potential etc.

Chapter 5 Traffic Studies and Analysis: discusses on the traffic surveys conducted, travel pattern, traffic projections etc.

Chapter 6 Improvement Proposals: presents the improvement proposals for highway and CD structures, cross section schedules etc.

Chapter 7 Environmental Assessment: briefly presents the environmental impact assessment.

Chapter 8 Cost Estimate: presents the rate analysis, detailed analysis for BOQ assessment, cost estimations etc.

APPENDIX TO MAIN REPORT (VOLUME-I)

VOLUME II: DESIGN REPORT

This volume presents the details of field investigations carried out, analysis, design standards, and parameters considered, detailed designs of the improvement proposals of highway including bridges, project facilities and safety implements. The following are the section covered in Design Report.

1. Introduction
2. Road Carriageway and Cross-Sections
3. Improvement Proposals
4. Alignment Design
5. Junctions/ Intersections

6. Pavement Design
7. Geotechnical Investigations
8. Cross-Drainage Structures – Major and Minor Bridges
9. Cross-Drainage Structures – Culverts
10. Protection Works
11. Traffic Control and Safety Measures
12. Project Facilities and Traffic Calming Measures

VOLUME III: MATERIAL REPORT

VOLUME IV: ENVIRONMENT IMPACT ASSESMENT & RESETLEMMENT ACTION PLAN

VOLUME V: TECHNICAL SPECIFICATIONS

VOLUME VI: RATE ANALYSIS

VOLUME VII: COST ESTIMATE

VOLUME VIII: BILL OF QUANTITIES (BOQ)

VOLUME IX: DRAWING VOLUME

1.6 Alignment Approvals

We wish to mention that the scope of work for this alignment was deleted in Jan 2019 by the authority stating the fact that there was an overlap of works with other consultant. It may also be highlighted that previously the feasibility report was also submitted to the authority in June 2020. In successive review meetings held during May 2022, the consultant was directed to proceed for submission of DPR since the existing alignment to be followed only.

The alignment course/path followed for improvement proposals is along the existing road only except minor improvements in geometrics. Whenever the design alignment superimposes the existing alignment in considerable course of length, the approval from the state is not required. This point has already been discussed in review meetings of the DPR work progress in presence of the authorities of NHIDCL HQ. Additionally, the stake holders meeting was also completed on dtd. 28.06.2022 (MoM received on 04/07/2022) along with following facility proposal incorporation: -

1. Inclusion of Foot Over Bridge (FOB) and Bus shelter near Ch.4+500 due to presence of school.
2. Development of Parking area near School.

The same has also been incorporated in the design proposals.

CHAPTER-2
PROJECT ROADS DESCRIPTION

2.0 Introduction

This chapter deals with the existing features of project road, topographic details, site features, important structures, junctions, pavement characteristics and road safety requirements etc.

The name of the project highway is **"Dudhnoi-Dainadubi"**. It starts from its existing Km 0+00 of NH-217 and terminates at Dainadubi (km 8+415 Assam-Meghalaya State Border). Existing Length of Project Road is 8.415 km. However, the Design Length of the project section is 8+415 Km. The project section is a part of NH-217. The Projected Road lies in Goalpara district in the state of Assam.

2.1 Project Location

Project Road (Km. 0/000 to 8/415) commencing from Chainage 0/000 (Latitude: 25°58'58.65"N & Longitude- 90°46'56.20"E) at Dudhnoi passes through Thekashu Town, Damra Pat Para and terminates at Chainage 8/415 (Latitude- 25°54'33.23"N & Longitude- 90°46'28.20"E) at Dainadubi **Design Length-8.415 km.** The Project section is part of NH-217.

Project road lies in Goalpara district in the state of Assam.

Figure 2.1: Start and End Points

<table>
<tr>
<td> 
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<tr>
<td>Start Point of the Project Highway at CH:0+000 of NH-217 near Dudhnoi</td>
<td>End Point of the Project Highway at CH:8+415 in Dainadubi (Assam – Meghalaya State border)</td>
</tr>
</table>

2.2 Carriageway

The details of existing carriageway are given below.

Table 2.1: Summary of Carriageway Width & Pavement Type

S. no	Design Chainage From	Design Chainage To	C/W width (m)
1	0+000	8+415	7.00

Note: Proposed highway is a flexible alignment.

2.3 Terrain

The project highway passes through predominantly Plain and Rolling terrain. Summary of terrain is given below. The terrain photographs are listed below.

Table 2.2: Summary of Terrain

S. No.	Terrain	Length (km)	Percentage (%)
1	Plain terrain	8+415	100
Total (km)		**8.415**	**100**

Figure 2.2: Photographs Terrains

2.4 Land Use

The land use pattern along the project highway consists of Agriculture, Barren and Built-up (In Survey and in proposed Alignment). Ribbon settlements has been observed at many locations on project road.

Figure 2.3: Photographs of Land Use

Agricultural Land

Barren Land

Dense Built-up

Table 2.2 (a): List of Villages

Sr. No.	Village	CH Start (Km.)	CH End (Km.)
1	Dudhnoi Rajah Sahar pt. I	0+000	2+300
2	Dudhnoi Rajah Sahar pt. III	2+300	3+140
3	Damra Patpara	3+140	6+800
4	Nokmakundi	6+800	8+415

2.8 Pavement

The entire existing road is of Flexible pavement. The condition of the existing pavement varies location to locations from Fair to poor.

2.9 Junctions

There total 30 Junctions/Cross Roads of which 2 is Major junction & 28 are Minor Junction/Cross Road. Details of junctions/Cross Roads are given in the **Tables.** Some of the intersections are shown on **Figure 2.3.**

Table 2.3: List of Junctions Existing Major/Minor Junctions

Sr. No	Chainage	Side	Type of Junction	Major/Minor	Cross Road Name
1	0.000	BOTH	+	Major	Junction with NH-17
2	0.170	LHS	T	Minor	To Colony
3	0.305	LHS	T	Minor	To Colony
4		RHS	T	Minor	To Colony
5	0.470	LHS	T	Minor	To Colony
6	0.530	RHS	T	Minor	To Milan Path
7	0.680	LHS	T	Minor	To Colony
8	0.705	RHS	T	Minor	To Colony
9	0.800	RHS	T	Minor	To Colony
10	0.840	LHS	T	Minor	To Colony
11	1.010	LHS	T	Minor	To Colony
12	1.020	RHS	T	Minor	To Colony
13	1.180	RHS	T	Minor	To Jyoti Chira Mill
14	1.240	LHS	T	Minor	To Colony
15	1.360	LHS	T	Minor	To Colony
16	1.370	RHS	T	Minor	To Colony
17	2.040	RHS	Y	Minor	To Colony
18	2.300	Both	+	Minor	To Colony
19	2.570	RHS	T	Minor	To Colony
20	2.640	LHS	T	Minor	To Colony
21	3.100	LHS	T	Minor	To Colony
22		RHS	T	Minor	To Colony
23	4.100	RHS	Y	Minor	To Bakrapur
24	4+540	LHS	T	Minor	To Damra village

Sr. No	Chainage	Side	Type of Junction	Major/Minor	Cross Road Name
25	5.140	RHS	T	Minor	To Colony
26	5.500	RHS	T	Minor	To Colony
27	5.800	RHS	T	Major	To Laskerpara village
28	6.390	LHS	T	Minor	Village road
29	7.880	LHS	Y	Minor	Village road
30	8.110	RHS	T	Minor	Village road

Figure 2.3: Photographs of Junctions

2.10 Grade-Separated Structures (ROB/RUB/Underpass/Flyovers)

Nil

2.12 Cross-drainage Structures

(a) Major & Minor Bridges

There is 02 numbers of Minor Bridges exist on the project road which is in fair condition dimensions when compared to 2L+PS requirement.

Table 2.4: List of Bridges

S. No.	Design Chainage (km)	Bridge Category	Type of Structure			No of spans with Span Length (m)	Width (m)
			Foundation	Sub structure	Super Structure		
1	4+150	Minor	Open	-	T- Beam	1x24.00	7.50
2	6+805	Minor	Open	RCC	RCC Slab	3x9.00	7.50

Figure 2.4: Photographs of Minor Bridges

(b) Culverts

There are 9 existing Slab culverts on the project road. Some of the culverts are either of small opening or blocked/damaged. Structural condition of some of the culverts were poor. Vegetation growth were also observed near the opening of the structure, hindering the water flow. Thus, reducing the hydraulic efficiency of the culverts.

Table 2.5: List of Existing Cross-drainage Structures Culverts

S. No.	Design Chainage	Type of Culvert	No. x span length /diameter (m)	Width (m)	Remarks
1	0.800	RCC Slab Culvert	1 x 1.50	12	Poor
2	2.345	RCC Slab Culvert	1 x 1.50	12	Poor
3	3.385	RCC Slab Culvert	1 x 1.80	12	Poor
4	5.515	RCC Slab Culvert	1 x 1.50	12	Poor
5	5.915	RCC Slab Culvert	1 x 1.60	11.9	Poor
6	6.305	RCC Slab Culvert	1 x 1.00	12	Poor
7	6.445	RCC Slab Culvert	1 x 1.00	11.8	Poor
8	7.110	RCC Slab Culvert	1 x 1.50	11.9	Poor
9	8.410	RCC Slab Culvert	1 x 1.60	12	Poor

Figure 2.5: Photographs of Cross Drainage Structures

2.13 Public Facilities

Many Public Facilities are situated along the Project Road such as Bush Shelters, Public Schools, Religious Structures etc. Details are tabulated below:

Table 2.6: List of Public facilities

Sr. No.	Public Facilities	(Nos.)
1	Bus Shelter/ Waiting Hall	5
2	Govt. School/ College	8
3	Govt. Offices/ Building	5
4	Hospital	2
5	Police Station / Outpost	4

Figure 2.6: Photographs of Bus Shelters & School

School at CH: 4+000

Bus Waiting Shed at CH: 3+100

Hospital at CH: 4+300

Police Outpost at CH: 5+000

2.14 Utilities

Utilities are found within ROW at many locations in the project stretches. Electric lines are crossing at few locations on the project stretches.

Figure 2.5: Photograph of Utilities

Mobile Tower at CH:0+070

Mobile Tower at CH:0+320

Electric Line Crossing at CH:1+700

Electric Line Crossing at CH:5+000

2.16 Road Side Furniture/Traffic Control Devices

Entire road side furniture will be needed to be installed afresh since the project is a greenfield alignment. However, a few roads signage was observed along some parts of existing road locations.

Figure 2.6: Road Side Furniture

Road Signage at CH:3+520

Road Signage at CH:4+200

Road Signage at CH:5+180

Road Signage at CH:5+300

2.17 Side Drains along the project road

There are existing Footpath cum Covered RCC Drain, Box Drain and Trapezoidal Lined CC Drain mostly along the project highway, details are given in table below:

Figure 2.7: Photographs of Drains

Side drain RHS CH:4+000 to 4+200

Side drain LHS CH:4+000to 4+200

CHAPTER-3
ENGINEERING SURVEYS AND INVESTIGATIONS

3.1 Preliminary Surveys

The relevant engineering surveys and investigations have been carried out along the project roads conforming to IRC Specification. These Surveys have been conducted as per TOR to generate adequate database for preparing the most appropriate Improvement proposal for strengthening and upgrading the existing carriageway.

The various engineering surveys and investigations apart from the traffic surveys, which have been carried out for the project roads, are listed below:

- Road Inventory
- Road Pavement and Condition Survey
- Structure Inventory and Condition Survey
- Topographical Survey
- Pavement Investigations
- Soil and Material Investigations

The basic data collected from different engineering surveys and the results of the survey investigations and data analysis are compiled and presented as Appendix

Topographical Survey details would be provided through separate report.

3.2 Road Inventory

The manner of analysis and further usage of the collected data is briefly explained in the following subparagraphs.

Road Inventory covering all the existing physical features such as terrain, land-use, roadway, carriageway width and type, shoulder width and type, Horizontal and Vertical alignments and design speed of existing road, type of cross-section (cut or fill), general drainage conditions, RoW boundaries, Sub-grade/Local soil type, location of water bodies and retaining structures, utility lines passing along or crossing the project roads, and all other features that may have influence on the project roads widening/improvement works.

The information collected, analysed and plotted will constitute the core database for formulating improvement proposals for further validation and finalization in the light of the results of the detailed surveys and investigations. In particular, action will be initiated in respect of the following:

- Decision on the location of the widening of carriageway if required, to be on the left, right or concentric with reference to the existing carriageway.
- Fitting in different typical cross-sections in the various stretches of the road in consideration of terrain conditions, available land width, roadside features etc.
- Treatment to be given to congested built-up stretches.
- The number of trees likely to be affected by the road improvement works, the expected environmental impacts, the extent of R&R implications etc.
- The location and number of places of worship, burial ground, etc. likely to be affected
- The utility lines by type, location and extent that would require relocation.

The Road Inventory data presented as **Appendix-1** of Appendix to Main Report.

3.2.1 Terrain

The project highway passes through predominantly Rolling and Mountainous terrain. The terrain photographs are listed below.

Table 3.1: Terrain Details

S. No.	Terrain	Length (km)	Percentage (%)
1	Plain terrain	8.415	100
Total (km)		**8.415**	**100**

Figure 2.8 : Terrains photographs

3.2.2 Land use

The land use pattern along the project highway consists mostly of Agriculture, Urban/Rural, Barren and Dense Vegetation types. The details are as given in the table below. Ribbon development along settlements has been observed at many locations on project road.

Agricultural Land

Barren Land

Dense Built-up

3.2.3 Carriageway Width

The existing road has Two-lane (7.00 m) configuration. Chainage wise details of existing carriageway has been shown in the following table present:

Table 3.2: Existing Carriageway Width

S. no	Design Chainage From	Design Chainage To	C/W width (m)
1	0+000	8+415	7.00

3.2.5 Junctions/Cross-roads

There total 28 junctions of which 2 is Major junctions & 26 are Minor Junction/Cross Road. These are shown in Table 2.3.

3.3 Road and Pavement Condition Survey

The objective of the road and pavement condition survey is to identify defects/ distresses of the project roads and to evaluate road sections with similar distress characteristics. The condition survey covered the following road elements during the field study:

(a) **Pavement:**

- cracking (narrow <3mm and wide >3mm cracking), % of pavement area affected;
- raveling, % of pavement area affected;

- potholing, % of pavement area affected;
- edge break, length (m); and
- rut depth, mm [type I (<10mm), type II (10-20mm) and type III (>20mm)]

(b) Shoulder:

- paved: same as for pavement; and
- unpaved: material loss (level difference between the paved surface and shoulder), edge drop and corrugation,

(c) Embankment:

- general condition; and
- extent of slope erosion

(d) Drainage:

- general condition;
- connectivity of drainage turnouts into the natural topography;
- condition in cut sections (if any); and
- condition at high embankments

The pavement condition survey has been carried out by visual means and supplemented by actual measurements to meet the study requirements wherever alignment follows the existing road. All elements as listed above, have been systematically referenced, recorded, analysed and quantified for the purpose of determining the pavement condition of project roads (refer to successive sections for details).

Based on the pavement condition, the pavement sections are classified as good, fair, poor or failed based on the criteria given in IRC: 81-1997, Para 4.2.1, as replicated in Table 3.5.

Table 3.3: Criteria for Classification of Pavement Sections

Sr. No.	Classification	Pavement Condition
1.	Good	No Cracks rutting less than 10mm
2.	Fair	No cracking or cracking confined to single crack in the wheel track with rutting between 10mm and 20mm
3.	Poor	Extensive cracking or/and rutting greater than 20mm
4.	Very Poor	Cracking exceeding 20 per cent and rutting greater than 20mm

The pavement condition survey reveals the following:

- The existing pavement is flexible/earthen pavement
- Cracking, patching, rut, potholes and edge break are common pavement distresses.
- Shoulder condition was poor and having inadequate width and edge drop is found at many locations.
- Road side drain does not exist at many locations.
- Existing embankment height is generally low.

3.4 Inventory and Condition Survey of Structures

3.4.1 Inventory of Structures

The aim of the section is to present the details of existing structures, present condition of existing structure and functioning of structures.

As a part of this section, a team of engineers and technical assistants carried out inventory and conditional survey for existing culverts, major & minor bridges. The Inventory and Condition survey data of bridges and culverts is given in Appendix. The summary of existing structures are given in Table 3.4:

Table 3.4: Summary of existing structures

Sr.No.	Type of Structure	Existing Nos.
1.	Minor Bridge	2
2.	Slab Culvert	9
Total		**11**

3.4.2 General Comments

The Structure inventory and condition survey had been carried out on the following basis.

- Details of existing bridges/culverts such as type of structure, Clear span, vent height, hydraulic adequacy and condition have been measured at site and recorded.
- The condition of existing structures is based on visual observation. Design chainage in proposed road corridors have been considered taken for reference.
- The flow direction is indicated w.r.t the increasing chainage. In the entire stretch, no sign of river overtopping could be found on any existing structure.

3.4.3 Condition observed in Bridges and Other Structures

The following common defects were observed during the visual condition survey of bridges and other structures:

(a) Damaged/Missing - Hand Rails/Parapet/Crash Barrier

Parapets/Railing/Crash Barrier etc. are found to be damaged or not at all provided at number of structures. This is more frequent at bridges and culverts. For most of the bridges, there is no provision of safety measures.

(b) Bed scouring

The ground at the bridge locations is found to be scoured at many bridge sites.

(c) Poor condition of Deck/Slab

Poor condition of a super structure is clearly visible at few structure locations. The deck seems to be deflected from the original line.

(d) Stone Masonry substructure

Poor condition of the stone masonry is observed at many structure locations. The stones are open up and not connected with each other. The stone surfaces are also worn away by water.

(e) Drainage Spouts

In addition to the above, it is found that the drainage spouts are not provided in most of the structures. For structures where spouts are provided, it has following problems:

- Missing spout grating.
- Spout hole blocked by debris.
- Leakage around drainage spout from holes made in deck slab for fixing spouts and left unplugged.
- Down take pipe of drainage spout ending at face of deck slab.
- At some bridge locations, drainage spouts have not been provided at all.

(f) Wearing Coat

The bituminous wearing coat in most cases is in fair condition with some common distresses like potholes, scaling, and undulations.

(g) Expansion Joints

These are all mostly small spans and expansion joint is not provided in any of the bridges.

(h) Bearings

These are all mostly small spans and bearings are not provided in any of the bridges. Tar paper might have been provided at the time of construction.

Note: The project alignment is entirely new except some locations where existing village road is present. therefore, the existing structures are of sub-standard criteria when compared to requirements set forth in IRC standards.

The detailed inventory of Culvert and Bridges are presented as Appendix-II & III of Appendix to Main Report.

CHAPTER-4
SOCIO-ECONOMIC PROFILE

4.1 General

This Chapter provides a socio-economic profile of the state and the relative status of the project influence area within the state. The aspects covered include demography, employment pattern, state income and major economic sectors including transport infrastructure. The profile discusses the past performance and the present scenario and, also presents a broad assessment of the perspective growth of the economy as a basis for estimating the future growth in transport demand.

4.2 Project Influence Area (PIA)

The Project Influence Area (PIA) is the relative importance of the project road in terms of the share of traffic contributed by various states/ districts. The broad influence area of the project road is taken as the State of Assam since majority of the traffic served by the road is from the state.

Assam, the gateway to the North East India is the largest State in the North East is bordering seven states viz. Arunachal Pradesh, Monipur, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal and two countries viz. Bangladesh & Bhutan. The State is endowed with abundant fertile land and water resources with total geographical area of 78,438 sq.km. of which 98.4 % area is rural. Assam shares about 2.4 % of the country's total geographical area and provides shelter to 2.6 % population of the country. Most of the state population lives in the lush valleys of its two major river system in the 30 districts of the Brahmaputra valley & 3 districts of the Barak valley. Less densely populated three hill districts viz. Karbi-Along, West Karbi-Along & Dima Hasao, set in the low-laying hills that separate the two valleys. For administrative and revenue purposes, the state has 33 districts including four districts Under the Bodoland Territorial Council (BTC) area viz. Kokrajhar, Chirang, Baska & Udalguri and 6 newly created districts viz., Biswanath, Charaideo, Hojai, South Salmara-Macachar , West Karbi-Anglong and Majuli.

Assam is administratively divided into 33 districts with 80 sub-division, 219 Development Blocks and 2202 Gaon Panchayats, out of which 3 districts with 4 sub-divisions & 16 Development Blocks are under three hill districts of Karbi-Along, East Karbi-Along & Dima Hasao. Further, four district with eight sub-divisions are under Bodoland Territorial Council (BTC) area viz Kokrajhar, Chirang, Baska & Udalguri. The Brahmaputra valley consists of North Bank Plains Zone (NBPZ), Upper Brahmaputra valley Zone (UBVZ), Central Brahmaputra valley Zone (CBVZ) and Lower Brahmaputra Valley Zone (LBVZ), whereas the Barak Valley Zone mainly consists of plain area of three districts, viz. Cachar, Karimganj & Hailakandi.

The existing alignment of Dudhnoi to Dainadubi connecting major built ups of such as Dudhnoi, Thekashu Town, Damra Pat Para, Dainadubi. Wherever existing roads are encountered, the Right of Way (RoW) varies from 10.0 to 23.0m, which has been based on measurement of available road width along the project only. The project road length is around 8+415 km.

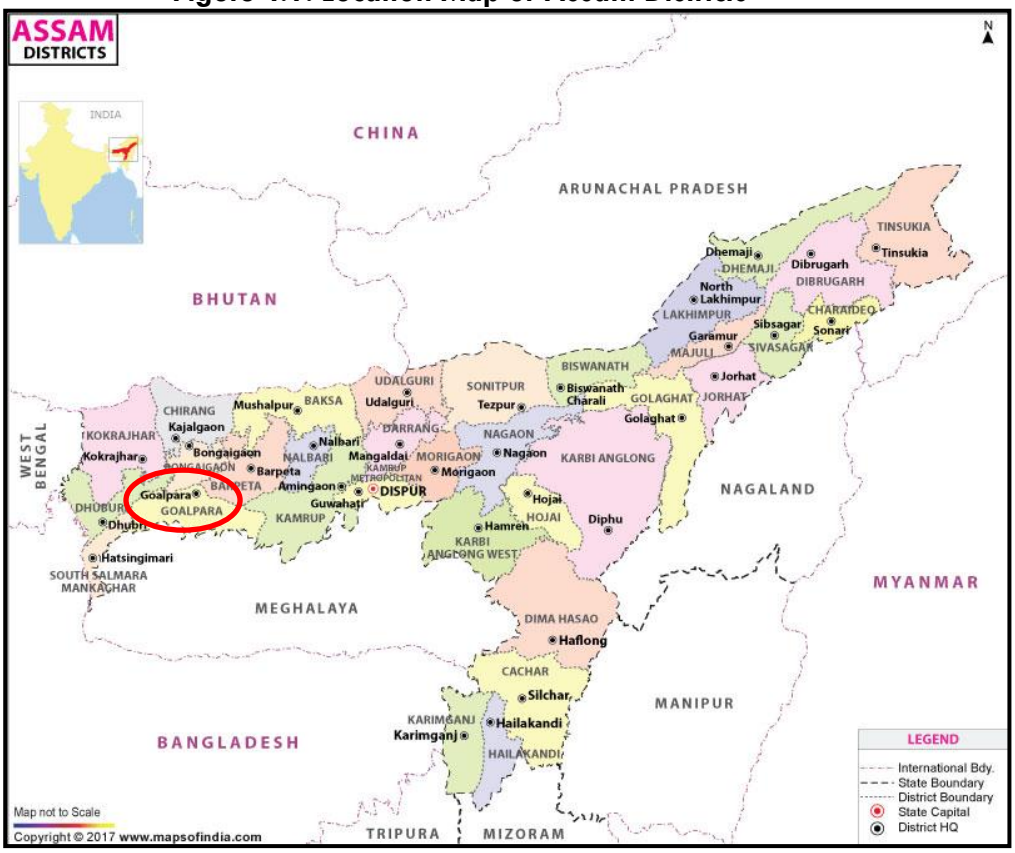
A detailed accounting of the socio-economic profile of the Project Influence Area (PIA) has been prepared which covers the PIA's economic performance of the past and establishes the likely growth prospects of the future. The output of this Chapter is the economic growth prospects of the PIA with respect to certain selected economic variables and serves as the basis for arriving at a realistic traffic growth rate.

4.3 Demographic Profile Of PIA

Assam has heterogeneous population with socio-cultural & ethnic diversity. According to the Census of India, 2011 the population of Assam stands at 312.05 lakh of which 159.39 lakh are male and 152.66 lakh are female. The decadal growth of the State's population works out at 17.07 percent during the decade 2001-2011 as against 17.68 percent for the country as a whole. Out of the total

312.05 lakh population, 86 percent population live in rural areas & 14 percent population live in urban areas of the State. The density of the population of Assam has increased to 398 persons in 2011 from 340 persons in 2001 Census or on an average, 58 more people inhabit every square kilometer in the State as compared to a decade ago. Further details of the Rural and Urban areas are mentioned respectively in Table 4.1.

Figure 4.1: Location Map of Assam Districts



Project District

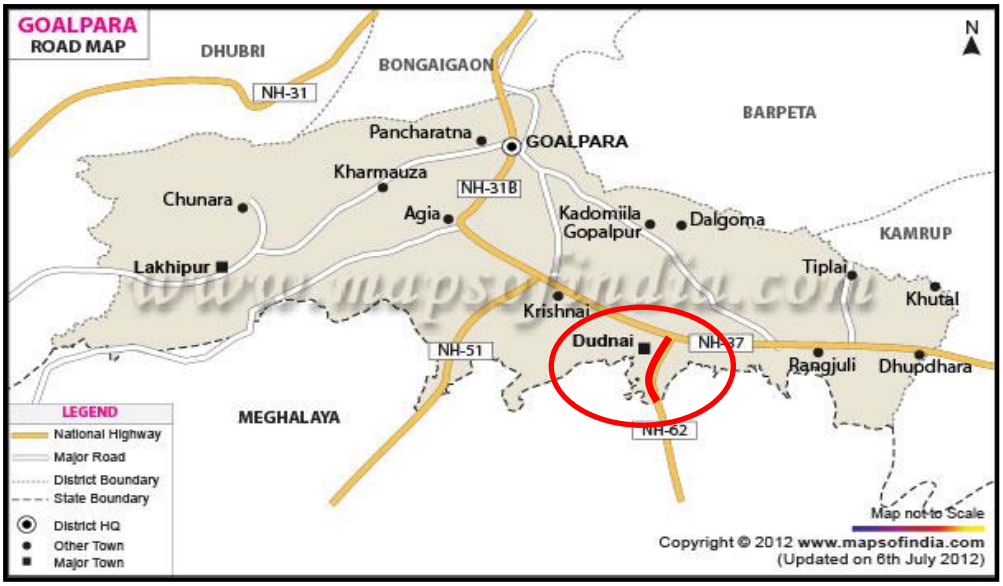


Table 4.1: Demographic Profile of Project Region

\State/ District	Year	Population			% of Urban Population	Avg. Density (pop./sq.km)
		Total	Rural	Urban		
Assam	2011	3,12,05,576	2,68,07,034	43,98,542	14.10	398
PROJECT AREA DISTRICTS						
Goalpara	2011	10,08,183	8,70,121	138,062	13.69	553

Source: Census, 2011

The present Goalpara district was created in the year 1983 with two sub-divisions viz Goalpara Sadar sub-division and North Salmara Civil sub-division, carved out from erstwhile Goalpara district. However, the same was again reconstituted in the year 1989 with only Sadar sub-division of Goalpara and the Civil sub-division of North Salmara was taken away in that year and merged with newly created Bongaigaon district. At present the district of Goalpara is situated entirely on the south bank of the river Brahmaputra. The district covers an area of 1,824 sq. km. and is bounded by West and East Garo Hill districts of the state of Meghalaya on the south and Kamrup district on the East, Dhubri district on the West and mighty river Brahmaputra all along the North.

Goalpara district is an administrative district in the state of Assam in India. The name of the district is widely said to have originally derived from 'Gwaltippia' meaning Guwali village or village of the milk men. The story of Goalpara goes back to several centuries. Based on the Chinese traveler 'Hiuentsang' report, Sir Edward Gait had concluded that the erstwhile capital of state of the Kumar Bhaskar Varman is either in Goalpara district or in Coach Behar. The district came under British rule in 1765. Before this the area was under the control of the Coach dynasty. In 1826 the British accessed Assam and Goalpara was annexed to Assam in 1874, along with the creation of V headquarters of Dhubri. On 1st of July, 1983, two districts were split from Goalpara: Dhubri and Kokrajhar. On 29th of September 1989, Bongaigaon district was created from parts of Goalpara and Kokrajhar.

The Goalpara district was endowed with natural beauty and archaeological treasures. The important tourist spot of the district include: Sri Surya Pahar, a very significant but relatively unknown archaeological site in Assam, a hill which showcase the remains of cultural heritage of three important religions of India, Buddhism, Jainism and Hinduism. Dadan hill has a Shiva Temple on its top. The temple was established by a general of the army of King Bana of Sonitpur named Dadan. The mystical hill is surrounded by a mythological story related to the bygone era. Pir Majhar is situated at the heart of the Goalpara town, a tomb of a saint named Hazarat Sayed Abul Kashem Kharasani. He is saint respected by Hindus and Muslim alike. Hulukanad hill is located at the heart of Goalpara. Sri Tukreswari hill, Paglartek Baba at Barbhita, Urpod beel of Agia, Dhamar Risen beel of Lakhipur is some other attractions of the district.

4.3.1 Settlements

There are 4 settlements along the road from Dudhnoi to Dainadubi. The main settlements are given below in **Table 4.2**.

Table 4.2: Settlements

Sl. No.	Starting Design Chainage	Ending Design Chainage	Village/Locality name	Length (m)
1	0/000	2/300	Dudhnoi Rajah Sahar pt. I	2.300
2	2/300	3/140	Dudhnoi Rajah Sahar pt. II	0.840
3	3/140	6/800	Damra-pat Para	3.660
4	6/800	8/415	Naka Makundi	1.615

4.4 Economy

4.4.1 Agriculture

The economy of Goalpara district is primarily agrarian as 90 percent of the population depends for their livelihood on agriculture. Paddy is the major crop. Other important crops include wheat, maize, oil seeds, pulses, cash crop like jute, vegetables etc. The district is also known for its production of areca nut and banana. A big market of banana has come up at Darangiri to which businessmen from all over India come. The agro climatic conditions of the district are conducive for various agricultural activities. Agriculture in the district is characterized by over dependence on rainfall, predominance of seasonal crops and traditional methods of cultivation.

4.4.2 Industries

The state of Assam is not an industrially developed state and the position of Goalpara district in industrial scenario of the state is insignificant. The district is industrially backward and there are no existing industries. It was a land locked district with poor transport and communication facilities till the opening of rail cum road bridge, the Narnarayan Setu, over the River Brahmaputra. It is also expected that the proposed Industrial Growth Centre at Matia (near Goalpara town) will give a boost to the development of industries in the district. The district has eight registered factories and about 1500 small scale units. The district has four handloom training centres, four weavers' extension services units and one handloom production centre.

4.4.3 Livestock and veterinary facilities

In the essentially agrarian economy of Assam, livestock is an essential and important contributor to the NSDP. Dairy and poultry farming can augment incomes and increase purchasing power. As indicated earlier, since the economy of Goalpara district is basically agrarian, as such the economic development of the district is highly dependable on agriculture and allied activities. Traditionally, dairy farming is a subsidiary occupation of the farmers of the district. Nevertheless, despite large population of live stock, the milk production in the district is low mainly due to predominance of local cows with a poor genetic make-up.

4.4.4 Sericulture

The agro-climatic condition of the district is suitable for sericulture. The activity is specially practiced by the local people including SC/ST families. Since sericulture mainly involves women in rearing and spinning, it has great potential for creating employment opportunities for them. Around 290 villages in the district are involved in sericulture activities.

CHAPTER-5
TRAFFIC SURVEY AND ANALYSIS

5.1 Traffic Surveys – Background Data

The traffic study aims at estimating the base year Average Daily Traffic and Travel Characteristics on the project corridor and forecasting the Annual Average Daily Traffic (AADT) for project horizon year. Various aspects of traffic study are presented in subsequence sections of this chapter. Results of the traffic analysis will form inputs for designing the pavement, capacity of the road, carrying out economic and financial analysis, planning the wayside amenities along with design of intersections etc.

5.2 Traffic Surveys and locations

To capture the traffic flow characteristics, travel pattern and other characteristics related to the Project Road, the following primary traffic surveys have been conducted

- Classified Traffic Volume Count (CTVC)
- Origin-Destination Survey (OD)
- Axle Load Survey (AL)
- Turning Movement Survey (TMC)

Traffic survey locations for carrying out CTVC, OD & axle load surveys were selected after a site reconnaissance considering the following parameters:

- The station should represent homogeneous traffic section
- The station should be outside urban and local influence
- The station should be located in a reasonably level terrain with good visibility
- The O-D stations should preferably be located near police stations for the convenience and safety of stopping vehicles for roadside interview survey.

The traffic survey schedule has been presented in the table below.

Table 5.1: Location and Schedule of different Traffic Surveys

Sr. No.	Type of Survey	Station/Homogeneous Section	Section Start & End	Location	Survey Date (dd/mm/yyyy)	Duration of Survey
1.	Classified Traffic Volume Count (CTVC)	km 0+000 to km 8+415	Dudhnoi km 0+000 to Dainadubi at km 8+415	At Km 3+500	17/11/2018-23/11/2018	7 days 24 hours
2.	OD Survey	km 0+000 to km 8+415	Dudhnoi km 0+000 to Dainadubi at km 8+415	At Km 3+500	23/11/2018	24 hours
3.	Axle Load Survey	km 0+000 to km 8+415	Dudhnoi km 0+000 to Dainadubi at km 8+415	At Km 3+500	23/11/2018	24 hours

5.3 Traffic Surveys Analysis

5.3.1 Average Daily traffic

The traffic volumes counted in 15-minute intervals have been aggregated to one-hour volumes. These are presented in the Appendix. The hourly volumes have been aggregated into daily volumes for the entire survey period (7-days). The daily volumes are then averaged for ADT. To express the classified vehicular count in terms of PCUs, the PCU factors as given in **IRC-64: 1990** have been considered. For ready reference, the PCU Factors considered in the analysis are given in the Table below.

Table 5.2: PCU Factors as per IRC 64:1990

Sr. No.	Vehicle Type		PCU Factor
1	Two-Wheeler		0.50
2	Car/Jeep/ Van/Taxi/ Auto		1.00
3	BUS	Mini	1.50
4		Standard	3.00
5	LCV		1.50
6	Truck	2-Axle	3.00
7		3 -Axle	3.00
8		Multi-Axle/ with Trailer	4.50
9	Agricultural Tractor	With Trailer	4.50
10		Without Trailer	1.50
11	Cycle		0.50
12	Cycle Rickshaw		2.00
13	Hand Cart		3.00
14	Animal Drawn	Bullock Cart	8.00
15		Horse	4.00

The summary of ADT, as observed on the Project Road, in terms of numbers of vehicles and PCU are given in the **Table 5.3**

Table 5.3: Summary of Average Daily Traffic (ADT)

Vehicle Category	At Km 3+500	
	ADT (Nos)	ADT (Nos)
Two-Wheeler	1753	877
Three-Wheeler/ Auto	1139	1139
Car/Jeep/Van/ Taxi	1076	1076
Mini Bus	70	105
Bus	21	63
LCV	255	383
2-Axle Truck	70	209
3-Axle Truck	5	16
M-Axle Truck	11	48
Tractor with Trailer	34	154
Tractor Without Trailer	2	2
Total Fast-Moving Vehicles (FMV)	**4435**	**4071**
Cycle	926	463
Cycle Rickshaw	1	1
Hand Cart	10	29
Bullock Cart	1	9
Horse Cart	0	0
Total Slow-Moving Vehicles (SMV)	**938**	**503**
Total	**5373**	**4573**
CVPD	**432**	**—**
Tollable Traffic	**1508**	**1899**

5.3.2 Temporal Variation

Analysis has been carried out to understand the following parameters on temporal variation of traffic on the Project Road

- Daily variation of traffic,
- Hourly variation of traffic, and
- Peak Hour Factor (PHF)

The results and findings from the above analysis are given below.

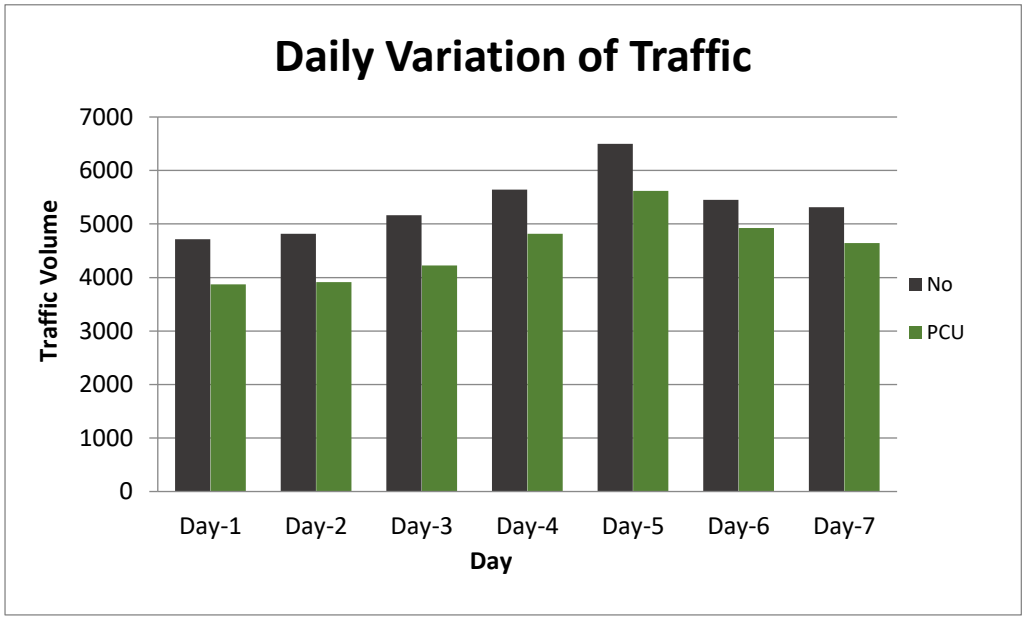
(a) Daily Variation

Daily variations in traffic in terms of number of vehicles & PCU at all the count locations are given below.

Table 5.4: Daily variation of Traffic

Daily Variation of Traffic	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
At Km 3+500							
Numbers	4718	4817	5166	5644	6501	5449	5315
PCU	3872	3916	4225	4816	5619	4922	4644

Figure 5.1: Daily variation of Traffic
At Km 3+500



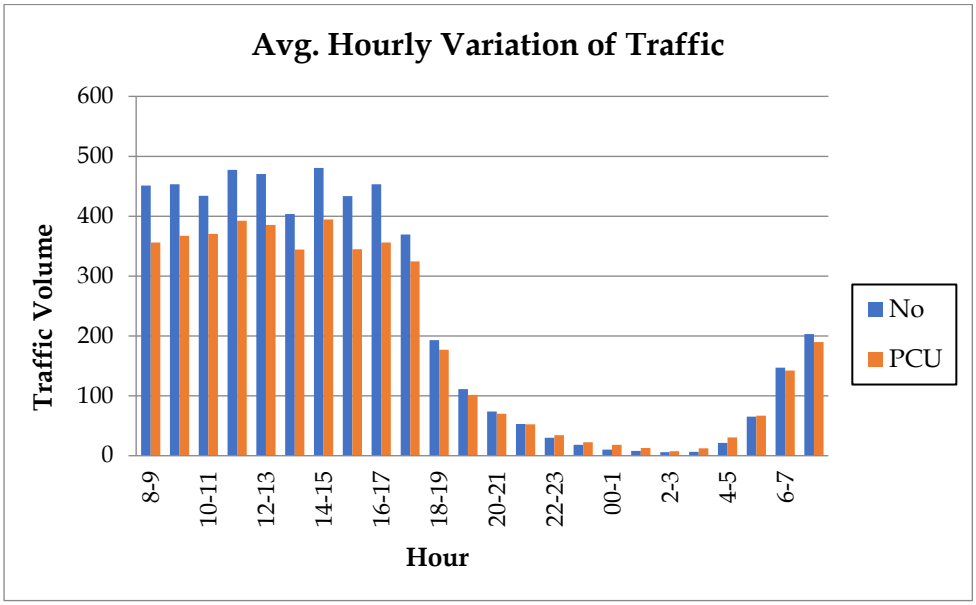
(b) Hourly Variation

Hourly variations in traffic in terms of number of vehicles & PCU at all the count locations are given below.

Table 5.5: Hourly variation of Traffic (Base Year-2019)

Time (Hour)	At Km 3+500		
	Traffic (Number)	Traffic (PCU)	Peak Hour Factor (%)
8-9	451	356	7.78
9-10	453	367	8.03
10-11	434	371	8.10
11-12	477	392	8.58
12-13	470	385	8.43
13-14	404	344	7.53
14-15	**480**	**394**	**8.62**
15-16	434	345	7.54
16-17	453	356	7.79
17-18	370	324	7.09
18-19	193	177	3.87
19-20	111	102	2.22
20-21	74	70	1.53
21-22	53	52	1.15
22-23	30	34	0.75
23-00	18	23	0.49
00-1	10	18	0.40
1-2	8	13	0.28
2-3	6	8	0.16
3-4	7	12	0.26
4-5	21	30	0.67
5-6	65	67	1.47
6-7	147	142	3.11
7-8	203	190	4.15
Total	**5373**	**4573**	

Figure 5.2: Hourly variation of Traffic Station-1



(c) Peak Hour Factors (PHF)

Hourly variations observed in traffic have been analysed for PHF (Peak Hour Flow as a percentage of the total day flow) and are summarized in Table below.

Table 5.6: Peak Hour Factors observed on the Project Road

Count Location	Peak Hour	PHF (%)
At Km 3+500	14.00-15.00	8.62

The above PHF represent a nearly uniform traffic distribution. As described earlier, smaller value of PHF (in the range 5-7) implies that the traffic on the project road is spread over a larger duration of time in a day.

5.3.3 Traffic Composition

The composition has been shown in the table below.

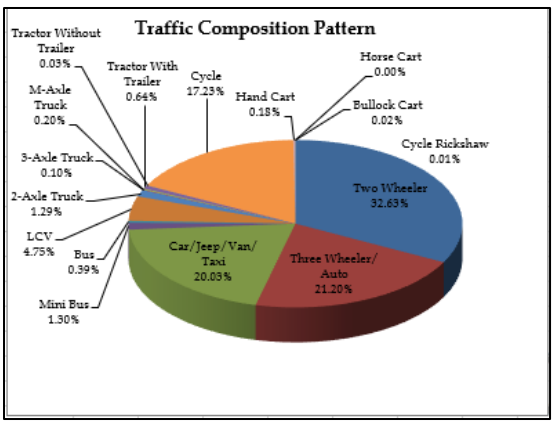
Table 5.7: Traffic Composition Pattern on the Project Road (Base Year-2019)

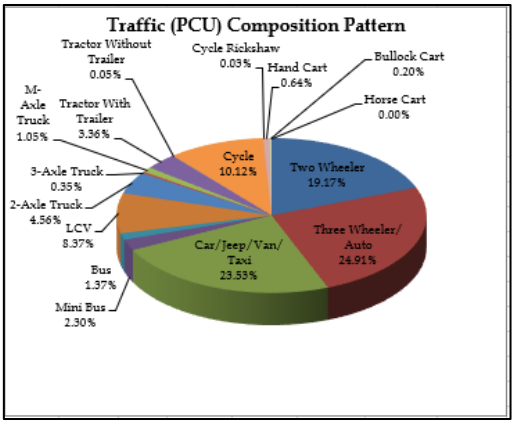
Vehicle Category	At Km 3+500	
	ADT (No)	% of Total
Two-Wheeler	1753	32.63
Three-Wheeler/ Auto	1139	21.20
Car/Jeep/Van/ Taxi	1076	20.03
Mini Bus	70	1.30
Bus	21	0.39
LCV	255	4.75
2-Axle Truck	70	1.29
M -Axle Truck	5	0.10
Artic/ Semi Artic	11	0.20
Tractor with Trailer	34	0.64
Tractor Without Trailer	2	0.03
Total Fast-Moving Vehicles (FMV)	**4435**	**82.55**
Cycle	926	17.23
Cycle Rickshaw	1	0.01

Vehicle Category	At Km 3+500	
	ADT (No)	% of Total
Hand Cart	10	0.18
Bullock Cart	1	0.02
Horse Cart	0	0.00
Total Slow-Moving Vehicles (SMV)	**938**	**17.45**
Total	**5373**	**100.00**

Figure 5.3: Traffic Composition Pattern

Section-1





5.3.4 Annual Average Daily Traffic (AADT)

The Average seasonal correction factors for petrol and diesel driven vehicles, described in the previous sections have been applied to ADT to derive AADT. The AADT is used for pavement design and economic analysis. The AADT, thus derived is given in the Table below.

Table 5.8 AADT at different survey locations (Base year-2019)

Vehicle Category	At Km 3+500	
	AADT (Nos)	AADT (PCU)
Two-Wheeler	1753	877
Three-Wheeler/ Auto	1139	1139
Car/Jeep/Van/ Taxi	1076	1076
Mini Bus	70	105
Bus	21	63
LCV	255	383
2-Axle Truck	70	209
M -Axle Truck	5	16
Artic/ Semi Artic	11	48
Tractor with Trailer	34	154
Tractor Without Trailer	2	2
Total Fast-Moving Vehicles (FMV)	**4435**	**4071**
Cycle	926	463
Cycle Rickshaw	1	1
Hand Cart	10	29
Bullock Cart	1	9
Horse Cart	0	0
Total Slow-Moving Vehicles (SMV)	**938**	**503**
Total	**5373**	**4573**
CVPD	**432**	**—**
Tollable Traffic	**1508**	**1899**

5.3.5 Origin – Destination Survey

To understand the travel pattern in the region, Origin and Destination (O-D) Survey was carried out for one day (24 hours) at the aforesaid locations.

The O-D survey on the project road was carried out based on the roadside interview method as per IRC: 102-1988. Both passenger and commercial vehicles plying on the project road were stopped on a random sampling basis and interviewed. Police assistance was arranged at the survey locations for successfully carrying out these surveys. The travel characteristics obtained by O-D survey facilitate the identification of the traffic characteristics based on its origin and destination.

Trained enumerators under the supervision of transport planners collected the trip characteristics using the survey forms designed for this purpose. The O-D survey elicited characteristics like origin, destination, frequency, length of trip, etc., both for passenger and goods vehicles. The information collected during roadside interviews was analysed to obtain the trip distribution based on a zoning system suitably designed in the study.

Before presenting the travel pattern, the sample size considered for O-D surveys are presented first in the following section.

(a) <u>Zoning System</u>

For understanding the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a scientifically derived zoning system was adopted. Two major types of areas were identified on a broad basis, i.e.

- **Immediate Influence Area (IIA) of the Project Road:** This region contributes to most of the trips observed on the Project Road, and primarily includes the towns/cities and districts around and near the Project Road.
- **Project Influence Area (PIA) of the Project Road**: This region contributes trips, but to a lesser degree when compared to IIA.
  While defining zone boundaries, the following were considered:

- Important towns and industrial centers along the project road and competing roads in the region.
- Administrative boundaries of district and state boundaries.
  Configuration of the project roads in the regional road network with respect to another SH & NH.

The travel pattern observed on the project road is fairly simple; with most of the traffic is state bound.

The Zoning System considered in this study has been presented in Table.

Table 5.9: Zoning System Considered for the Study
At Km 3+500

Zone No.	Zone Description	Zone Type	Remarks
1	Local within 5-8km from survey location (Dudhnoi, Damra, Manupara etc.)	Internal	Local
2	Rest of Golpara District (Assam)	Internal	City/Town level
3	Barpeta, Bogaigaon, Dubri (Assam)	External	District Level
4	Guwahati District & Kamrup District (Assam)	External	District Level
5	Rest of Assam	External	State Level
6	North Garo Hills & East Garo Hills (Meghalaya)	External	District Level
7	South West Garo Hills & West Garo Hills (Meghalaya)	External	District Level
8	East Khasi Hill & West Khasi Hill (Meghalaya)	External	District Level
9	Rest of Meghalaya	External	State Level
10	Mizoram, Nagaland, Tripura State	External	State Level
11	West Bengal,Jharkhand & Sikkim	External	State Level
12	Rest of India	External	State Level

(b) Travel Pattern

The origins and destinations of various types of vehicles observed at the O-D survey locations have been analysed for O-D Matrices as per the Zoning System presented above. O-D matrices for Passenger's vehicle and Goods vehicles are given in the Tables below.

Table 5.10: Trip Matrix of passengers & Goods Vehicles
At Km 3+500 (Passenger Vehicles)

ORIZIN ZONES	DESTINATION ZONES													TOTAL
	O/D	1	2	3	4	5	6	7	8	9	10	11	12	
	1	14	7	2	0	0	2	0	1	1	0	0	0	27
	2	3	0	0	0	0	9	1	9	5	0	0	0	27
	3	1	0	0	0	0	2	3	5	2	0	0	0	13
	4	8	0	0	0	0	10	2	12	1	0	0	0	33
	5	1	0	0	1	0	2	1	3	0	0	0	0	8
	6	9	7	3	2	0	0	0	0	0	0	0	0	21
	7	2	2	3	0	0	0	0	0	0	0	0	0	7
	8	0	0	0	0	0	0	0	0	0	0	0	0	0
	9	10	14	5	3	1	0	0	0	0	0	4	0	37
	10	0	0	0	0	0	0	0	0	0	0	0	0	0
	11	2	0	0	0	4	1	0	4	0	1	0	0	12
	12	0	0	0	4	0	0	0	2	0	0	0	0	6
	TOTAL	50	30	13	10	5	26	7	36	9	1	4	0	191

At Km 3+500 (Goods Vehicles)

ORIZIN ZONES	DESTINATION ZONES												TOTAL
	O/D	1	2	3	4	5	6	7	8	9	10	11	12	
	1	12	3	1	2	1	1	0	0	0	2	0	0	22
	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	4	0	0	0	2	3	0	5	0	0	0	0	14
	4	5	0	0	0	2	4	0	2	0	0	4	0	17
	5	0	2	1	3	1	1	0	1	0	1	0	0	10
	6	0	2	0	0	0	0	0	0	0	0	0	0	2
	7	0	5	0	0	1	0	0	0	0	0	1	0	7
	8	2	5	0	1	1	0	0	0	0	0	0	0	9
	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	10	0	6	3	3	3	0	0	0	0	0	1	0	16
	11	0	0	0	0	0	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	23	23	5	9	11	9	0	8	0	3	6	0	97

(c) Zone Influence Factor

Zone Influence Factors (ZIF) can be explained as the relative contributions of various zones to trip generation. The ZIF are calculated as follows:

$$ZIF_i = \frac{O_i + D_i}{2\sum_{i=1,n,\ j=1,n} T_{ij}}$$

Where,

ZIF_i is the Zone Influence Factor of Zone i

O_i is the number of trip productions from Zone i

D_i is the number of trip attractions from Zone i

T_{ij} is the number of trips between Zones i & j

Table 5.11: Zone Influence Factor

Passenger Vehicles (At Km 3+500)

Zone No.	Zone Description	Trip Production	Trip Attraction	ZIF (%)
1	Local within 5-8 km from survey location (Dudhnoi, Damra, Manupara etc.)	27	50	20.16
2	Rest of Golpara District (Assam)	27	30	14.92
3	Barpeta, Bogaigaon, Dubri (Assam)	13	13	6.81
4	Guwahati District & Kamrup District (Assam)	33	10	11.26
5	Rest of Assam	8	5	3.40
6	North Garo Hills & East Garo Hills (Meghalaya)	21	26	12.30
7	South West Garo Hills & West Garo Hills (Meghalaya)	7	7	3.66
8	East Khasi Hill & West Khasi Hill (Meghalaya)	0	36	9.42
9	Rest of Meghalaya	37	9	12.04
10	Mizoram, Nagaland, Tripura State	0	1	0.26

Zone No.	Zone Description	Trip Production	Trip Attraction	ZIF (%)
11	West Bengal, Jharkhand & Sikkim	12	4	4.19
12	Rest of India	6	0	1.57
Total		**191**	**191**	**100**

Goods Vehicles (At Km 3+500)

Zone No.	Zone Description	Trip Production	Trip Attraction	ZIF (%)
1	Local within 5-8km from survey location (Dudhnoi, Damra,Manupara etc.)	22	23	23.20
2	Rest of Golpara District (Assam)	0	23	11.86
3	Barpeta, Bogaigaon, Dubri (Assam)	14	5	9.79
4	Guwahati District & Kamrup District (Assam)	17	9	13.40
5	Rest of Assam	10	11	10.82
6	North Garo Hills & East Garo Hills (Meghalaya)	2	9	5.67
7	South West Garo Hills & West Garo Hills (Meghalaya)	7	0	3.61
8	East Khasi Hill & West Khasi Hill (Meghalaya)	9	8	8.76
9	Rest of Meghalaya	0	0	0.00
10	Mizoram, Nagaland, Tripura State	16	3	9.79
11	West Bengal,Jharkhand & Sikkim	0	6	3.09
12	Rest of India	0	0	0.00
Total		**97**	**97**	**100**

From the above tables, the following travel pattern on the project road can be deduced:

This implies that passenger and goods traffic is mainly from the project district road and considerable goods traffic is from states adjacent to the Assami State and Rest of India. Means, goods traffic is travelling long distance as compared to passenger traffic.

5.3.6 Axle Load Survey

For the purpose of preliminary pavement design required for the project, axle load surveys have been carried out on the project road at the aforesaid locations.

The traffic census and the axle load surveys were conducted side by side. In the traffic census surveys, all types of vehicles traveling in both directions were counted throughout the Axle Load Survey period. The traffic census data provides the actual break down of the traffic composition. Due to the requirement of stopping a vehicle for weighing, it is not possible to weigh all the commercial vehicles passing through the site. More than20% of commercial vehicles were weighed in the 24 hours duration on a random sampling basis.

The vehicle damage factor (VDF) is a multiplier to convert the number of commercial vehicles of different axle loads and axle configuration to the number of standard axle load repetitions. It is defined as equivalent number of standard axles per commercial vehicle. The VDF varies with the vehicle axle configuration, axle loading, terrain, type of road and from region to region. The VDF is arrived at from axle load surveys on typical road sections so as to cover various influencing factors, such as traffic mix, mode of transportation, commodities carried, time of the year, terrain, road conditions and degree of enforcement.

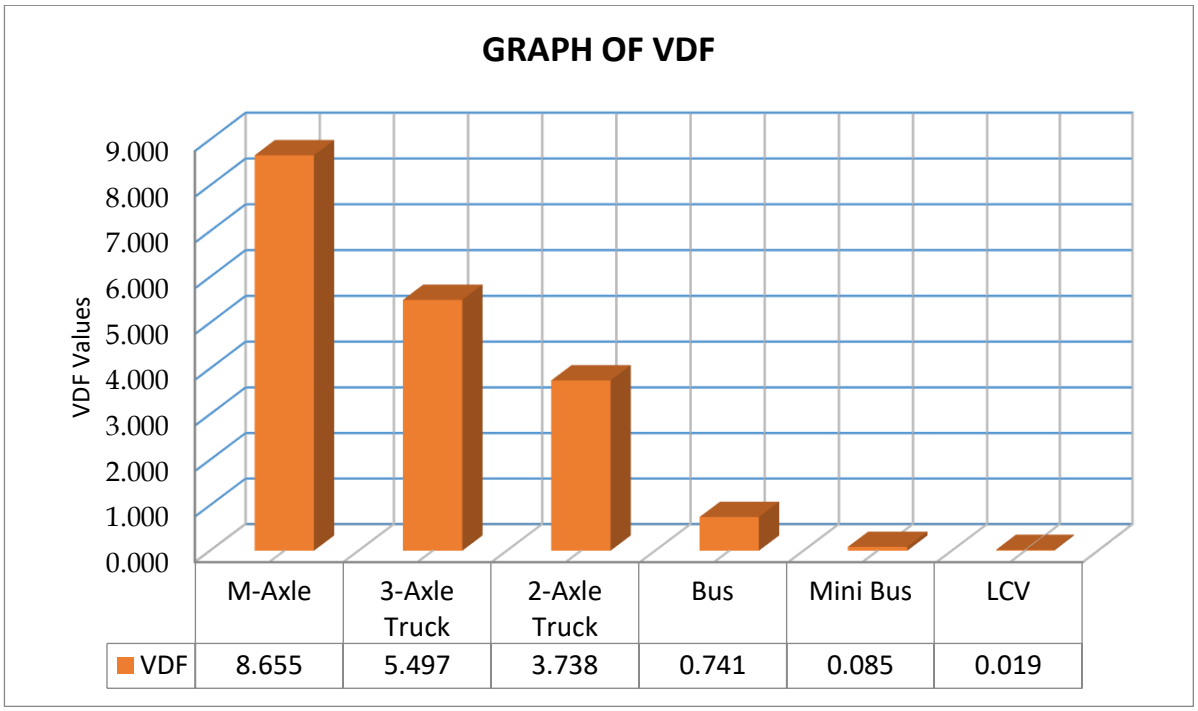
The axle load spectrum observed on the project road, along with the vehicle damage factors (VDFs) is given in the following Table. Details of VDF Calculation have been produced in Appendix.

Table 5.12: VDF observed on the Project Road

TYPE OF VEHICLES	Station-1 -VDF		
	UP	DOWN	MAX
M-Axle	8.655	4.084	**8.655**
3-Axle Truck	5.497	3.706	**5.497**
2-Axle Truck	2.619	3.738	**3.738**
Bus	0.334	0.741	**0.741**
Mini Bus	0.021	0.085	**0.085**
LCV	0.012	0.019	**0.019**

Figure 5.4: VDF observed along the Project Road

At Km 3+500



5.3.7 Traffic Growth Rates

As per IRC: 37-2018, minimum growth rate to be considered is 5%. Growth rates of slow-moving vehicles are assumed as 5%. Adopted growth rates of different vehicles are shown in the table below.

Table 5.13: Traffic Growth Rates (%) Adopted.

Types of Vehicles	Two-Wheeler	Three-Wheeler/ Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	Tractor With Trailer	Tractor Without Trailer	Cycle	Cycle Rickshaw	Hand Cart	Bullock Cart	Horse Cart
Growth Rats adopted (%)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

5.3.8 Traffic Forecasts

Traffic forecasts are required for planning and design of the Project Road (including Pavement Design). Traffic volume presented in the above clauses represents the traffic on the project road.

Traffic forecasts for a period of 20 years after completion of road construction (Traffic survey year-2018, DPR preparation year 2018-2021, construction period: 2022-2023 i.e.,2 years, and projection up to year of 2053 i.e.,30 years) have been presented in the Tables below.

Table 5.14: Traffic Forecasts
Station-1

Year	FAST MOVING VEHICLES											SLOW MOVING VEHICLES					Total (No)	Total (PCU)	Design Year/ Remark
	Two Wheeler	Three Wheeler/ Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	Tractor With Trailer	Tractor Without Trailer	Cycle	Cycle Rickshaw	Hand Cart	Bullock Cart	Horse Cart			
2018	1753	1139	1076	70	21	255	70	5	11	34	2	926	1	10	1	0	5373	4573	Design Period
2019	1841	1196	1130	74	22	268	73	6	11	36	2	972	1	10	1	0	5642	4802	
2020	1933	1256	1186	77	23	281	77	6	12	38	2	1021	1	11	1	0	5924	5042	
2021	1933	1256	1186	77	23	281	77	6	12	38	2	1021	1	11	1	0	5924	5042	
2022	2029	1319	1246	81	24	295	81	6	12	40	2	1072	1	11	1	0	6220	5294	
2023	**2131**	**1384**	**1308**	**85**	**25**	**310**	**85**	**6**	**13**	**42**	**2**	**1126**	**1**	**12**	**1**	**0**	**6531**	**5559**	**Construction Period**
2024	**2237**	**1454**	**1373**	**89**	**27**	**326**	**89**	**7**	**14**	**44**	**2**	**1182**	**1**	**12**	**1**	**0**	**6857**	**5837**	**1**
2025	2349	1526	1442	94	28	342	93	7	14	46	2	1241	1	13	2	0	7200	6129	**2**
2026	2467	1603	1514	98	29	359	98	7	15	48	2	1303	1	14	2	0	7560	6435	**3**
2027	2590	1683	1590	103	31	377	103	8	16	50	2	1368	1	14	2	0	7938	6757	**4**
2028	**2719**	**1767**	**1669**	**109**	**32**	**396**	**108**	**8**	**17**	**53**	**2**	**1437**	**1**	**15**	**2**	**0**	**8335**	**7095**	**5**
2029	2855	1855	1753	114	34	416	113	9	17	56	3	1508	1	16	2	0	8752	7449	**6**
2030	2998	1948	1840	120	36	436	119	9	18	58	3	1584	1	17	2	0	9189	7822	**7**
2031	3148	2045	1932	126	37	458	125	9	19	61	3	1663	1	17	2	0	9649	8213	**8**
2032	3306	2148	2029	132	39	481	131	10	20	64	3	1746	1	18	2	0	10131	8624	**9**
2033	**3471**	**2255**	**2130**	**139**	**41**	**505**	**138**	**10**	**21**	**68**	**3**	**1833**	**1**	**19**	**2**	**0**	**10638**	**9055**	**10**
2034	3644	2368	2237	146	43	530	145	11	22	71	3	1925	1	20	2	0	11170	9508	**11**
2035	3827	2486	2349	153	46	557	152	12	23	75	3	2021	2	21	2	0	11728	9983	**12**

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Year	FAST MOVING VEHICLES											SLOW MOVING VEHICLES					Total (No)	Total (PCU)	Design Year/ Remark
	Two Wheeler	Three Wheeler/ Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	Tractor With Trailer	Tractor Without Trailer	Cycle	Cycle Rickshaw	Hand Cart	Bullock Cart	Horse Cart			
2036	4018	2611	2466	160	48	585	159	12	25	78	4	2122	2	22	3	0	12315	10482	**13**
2037	4219	2741	2590	168	50	614	167	13	26	82	4	2229	2	23	3	0	12930	11006	**14**
2038	**4430**	**2878**	**2719**	**177**	**53**	**645**	**176**	**13**	**27**	**86**	**4**	**2340**	**2**	**25**	**3**	**0**	**13577**	**11556**	**15**
2039	4651	3022	2855	186	55	677	185	14	28	91	4	2457	2	26	3	0	14256	12134	**16**
2040	4884	3173	2998	195	58	711	194	15	30	95	4	2580	2	27	3	0	14969	12741	**17**
2041	5128	3332	3148	205	61	746	204	15	31	100	5	2709	2	28	3	0	15717	13378	**18**
2042	5384	3498	3305	215	64	784	214	16	33	105	5	2844	2	30	4	0	16503	14047	**19**
2043	**5654**	**3673**	**3470**	**226**	**67**	**823**	**224**	**17**	**35**	**110**	**5**	**2986**	**2**	**31**	**4**	**0**	**17328**	**14749**	**20**
2044	5936	3857	3644	237	71	864	236	18	36	116	5	3136	2	33	4	0	18194	15487	**21**
2045	6233	4050	3826	249	74	907	247	19	38	121	6	3293	3	35	4	0	19104	16261	**22**
2046	6545	4252	4017	261	78	953	260	20	40	127	6	3457	3	36	4	0	20059	17074	**23**
2047	6872	4465	4218	274	82	1000	273	21	42	134	6	3630	3	38	4	0	21062	17928	**24**
2048	**7216**	**4688**	**4429**	**288**	**86**	**1050**	**286**	**22**	**44**	**141**	**6**	**3812**	**3**	**40**	**5**	**0**	**22115**	**18824**	**25**
2049	7576	4923	4650	303	90	1103	301	23	46	148	7	4002	3	42	5	0	23221	19765	**26**
2050	7955	5169	4883	318	95	1158	316	24	49	155	7	4202	3	44	5	0	24382	20754	**27**
2051	8353	5427	5127	334	99	1216	332	25	51	163	7	4412	3	46	5	0	25601	21791	**28**
2052	8771	5699	5383	350	104	1277	348	26	54	171	8	4633	4	49	6	0	26881	22881	**29**
2053	**9209**	**5984**	**5653**	**368**	**110**	**1340**	**365**	**28**	**56**	**179**	**8**	**4865**	**4**	**51**	**6**	**0**	**28225**	**24025**	**30**

5.3.9 Lane Requirement

In the above table, traffic forecasts for a design period of 30 years (post construction) have been presented. Lane requirement for the project road has been calculated and has been presented in the Table below.

Table 5.15: Lane Requirement

Year	AADT (PCU)	Lane Requirement as per new MoRT&H Circular
2018	4573	2-Lane + P.S
2019	4802	2-Lane + P.S
2020	5042	2-Lane + P.S
2021	5042	2-Lane + P.S
2022	5294	2-Lane + P.S
2023	5559	2-Lane + P.S
2024	5837	2-Lane + P.S
2025	6129	2-Lane + P.S
2026	6435	2-Lane + P.S
2027	6757	2-Lane + P.S
2028	7095	2-Lane + P.S
2029	7449	2-Lane + P.S
2030	7822	2-Lane + P.S
2031	8213	2-Lane + P.S
2032	8624	2-Lane + P.S
2033	9055	2-Lane + P.S
2034	9508	2-Lane + P.S
2035	**9983**	**2-Lane + P.S**
2036	10482	2-Lane + P.S, capacity augmentation for 4-lane to be started
2037	11006	2-Lane + P.S, capacity augmentation for 4-lane to be started
2038	11556	2-Lane + P.S, capacity augmentation for 4-lane to be started
2039	12134	2-Lane + P.S, capacity augmentation for 4-lane to be started
2040	**12741**	**2-Lane + P.S, capacity augmentation for 4-lane to be started**
2041	13378	2-Lane + P.S, capacity augmentation for 4-lane to be started
2042	14047	2-Lane + P.S, capacity augmentation for 4-lane to be started
2043	**14749**	**2-Lane + P.S, capacity augmentation for 4-lane to be started**
2044	15487	4-Lane
2045	16261	4-Lane
2046	17074	4-Lane
2047	17928	4-Lane
2048	18824	4-Lane
2049	19765	4-Lane
2050	20754	4-Lane
2051	21791	4-Lane

As per MoRTH circular for road capacity dated 26th May 2016, it is evident that the augmentation for the 4 laning is to be taken up after the traffic reaches beyond 10000 PCU. As per projected traffic, the traffic is 10482 in year 2036. Additionally, it may be understood that the design service volume of the four-lane road as per IRC: SP-84 is 20000 PCU. However, the traffic is only 14047 PCU in 20th year of Design life. The extra traffic higher than 10000 will slightly affect the level of service. Had the traffic crossed the threshold of 20000 PCU in any year, 4-laning would have been recommended. Therefore, two lane with paved shoulders is recommended at present analysis for design life.

Table 5.16: Summary Lane requirement & adopted lane configuration

Section	Design AADT (PCU)	Lane Requirement as per IRC-64-1990	Adopted Lane Configuration
From Dudhnoi Km 0+000 to Dainadubi Km 8+415 (At Km 3+500)	14749	2-Lane with Paved shoulder	2-lane with paved shoulder

5.3.10 Million Standard Axle (MSA)

MSA is required to calculate crust thicknesses required for the proposed pavement. MSA for the project road has been presented in the following Table.

Table 5.17: Summary of Million Standard Axles (MSA)

Sr. No	Station	Calculated MSA on year 2043 (20th Design Year)	Calculated MSA on year 2050 (30th Design Year)	Adopted MSA
1	From Dudhnoi Km 0+000 to Dainadubi KMajor Bridgem 8+415 (At Km 3+500)	3.14	6.31	20

5.3.11 Pavement Crust Thickness of Flexible Pavement

As per Pavement Design Catalogue of IRC 37: 2018, flexible pavement thickness required is as follows:

Table 5.18: Proposed Flexible Pavement Composition

Section	Design Period (Years)	Calculated MSA	Adopted MSA	Design CBR (%)	Pavement Crust Compositions				
					BC (mm)	DBM (mm)	WMM (mm)	CTSB (mm)	Total (mm)
From Dudhnoi Km 0+000 to Dainadubi Km 8+415 (At Km 3+500)	20	3.14	20	7	30	50	150	200	**430**

The calculated pavement thicknesses have been checked by **IIT-PAVE** software. Analysis & result of IIT-PAVE have been attached in Appendix-V.

Overlay

For Overlay of the existing pavement falling weight deflectometer study was conducted in January 2019 & August 2022. The data analysis has been performed as per the standard procedure mentioned in IRC 115. The summary of the findings (as per latest data) is given below:

Overlay Design Summary (10 Years)		
Existinf Pavement Composition Adopted for aanalysis		
BT	50mm	
Granular	400mm	
Strength of Different Layers (Minimum) from Backcalculation		
BT Existing	983	Mpa
Granular Existing	234	Mpa
Subgrade	87	Mpa
Thickness of Different Layers (Minimum) adopted		
BT Existing	50	mm
Granular Existing	400	mm
Stress Analysis Result		
Tensile Allowed	276	
Tensile Calculated	244	
Comp. Allowed	484	
Comp. Calculated	304	
Result	Safe	
Overlay Details		
Thickness of BT (BC + DBM)	**80**	**mm**

CHAPTER-6
IMPROVEMENT PROPOSALS

6.1 General

Project Road (Km. 0/000 to 8/415) commencing from Chainage 0/000 (Latitude: 25°58'58.65"N & Longitude- 90°46'56.20"E) at Dudhnoi passes through Thekashu Town, Damra Pat Para and terminates at Chainage 8/415 (Latitude- 25°54'33.23"N & Longitude- 90°46'28.20"E) at Dainadubi **Design Length-8.415 km.** The Project section is part of NH-217.

Project road lies in Goalpara district in the state of Assam.

Project Road

Design of the project roads includes following design components:

- Analysis of present traffic and future projections;
- Analysis and design of pavement;
- Determination of requirements for the new pavement;
- Determination of adequacy of the hydraulic capacity and structural parameters of the existing structures;
- Determination of adequacy of the road's geometry (horizontal as well as vertical)
- Determination of adequacy of intersections and improvement measures; and
- Ensuring road safety aspects and these are addressed through provision of traffic control devices, roadside furniture and project facilities

6.2 Alignment and Geometry

The Project Highway is greenfield alignment. Two-Lanning with paved shoulders shall be undertaken. The paved carriageway shall be in accordance with the typical cross sections

Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for plain/rolling terrain to the extent possible within the available land available with the authority.

6.3 Proposed Right of Way (ROW)

Proposed ROW will be as per the table given below:

Table 6.1: Proposed Right of Way (ROW)

Sr. No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	EROW as per Revenue Records (m)	PROW (m)	Remarks
1	0.040	0.100	0.10	14.00	16.00	Built-up
2	0.100	0.200	0.10	12.00	16.00	Built-up
3	0.200	0.300	0.10	12.50	16.00	Built-up
4	0.300	0.400	0.10	10.50	16.00	Built-up
5	0.400	0.500	0.10	10.00	16.00	Built-up
6	0.500	0.600	0.10	10.80	16.00	Built-up
7	0.600	0.700	0.10	11.00	16.00	Built-up
8	0.700	0.800	0.10	12.00	16.00	Built-up
9	0.800	0.900	0.10	12.60	16.00	Built-up
10	0.900	1.015	0.12	11.70	16.00	Built-up
11	1.015	1.100	0.09	12.60	16.00	Built-up

Sr. No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	EROW as per Revenue Records (m)	PROW (m)	Remarks
12	1.100	1.200	0.10	15.00	16.00	Built-up
13	1.200	1.300	0.10	11.00	16.00	Built-up
14	1.300	1.360	0.06	13.00	16.00	Built-up
15	1.360	1.400	0.04	13.00	18.00	Built-up
16	1.400	1.500	0.10	11.60	18.00	Built-up
17	1.500	1.600	0.10	10.70	18.00	Built-up
18	1.600	1.700	0.10	10.90	18.00	Built-up
19	1.700	1.800	0.10	11.70	16.00	Built-up
20	1.800	1.900	0.10	11.40	16.00	Built-up
21	1.900	2.000	0.10	11.40	16.00	Built-up
22	2.000	2.160	0.16	12.00	16.00	Built-up
23	2.160	2.200	0.04	10.20	14.00	Built-up
24	2.200	2.300	0.10	10.30	14.00	Built-up
25	2.300	2.400	0.10	8.00	14.00	Built-up
26	2.400	2.500	0.10	6.60	16.00	Built-up
27	2.500	2.600	0.10	7.20	16.00	Built-up
28	2.600	2.700	0.10	7.50	16.00	Built-up
29	2.700	2.800	0.10	7.50	16.00	Built-up
30	2.800	2.900	0.10	8.00	16.00	Built-up
31	2.900	3.000	0.10	7.80	16.00	Built-up
32	3.000	3.140	0.14	9.50	16.00	Built-up
33	3.140	3.200	0.06	9.10	16.00	Built-up
34	3.200	3.300	0.10	7.80	16.00	Built-up
35	3.300	3.400	0.10	7.20	16.00	
36	3.400	3.500	0.10	9.10	14.00	
37	3.500	3.600	0.10	8.50	14.00	
38	3.600	3.700	0.10	9.30	14.00	
39	3.700	3.800	0.10	10.40	30.00	Realignment
40	3.800	3.900	0.10	9.50	30.00	Realignment
41	3.900	4.000	0.10	7.20	30.00	Realignment
42	4.000	4.050	0.05	9.50	30.00	Realignment
43	4.050	4.100	0.05	9.50	30.00	Realignment
44	4.100	4.200	0.10	9.50	30.00	Realignment
45	4.200	4.260	0.06	7.50	18.00	
46	4.260	4.300	0.04	7.00	16.00	
47	4.300	4.400	0.10	8.50	16.00	
48	4.400	4.440	0.04	12.00	16.00	
49	4.440	4.500	0.06	12.00	16.00	
50	4.500	4.600	0.10	10.00	16.00	
51	4.600	4.700	0.10	7.50	16.00	
52	4.700	4.740	0.04	10.00	16.00	
53	4.740	4.800	0.06	7.50	18.00	
54	4.800	4.900	0.10	10.00	18.00	
55	4.900	5.000	0.10	9.80	18.00	
56	5.000	5.080	0.08	9.80	18.00	Built-up
57	5.080	5.100	0.02	9.80	18.00	Built-up
58	5.100	5.200	0.10	10.00	18.00	Built-up

Sr. No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	EROW as per Revenue Records (m)	PROW (m)	Remarks
59	5.200	5.300	0.10	8.70	18.00	Built-up
60	5.300	5.400	0.10	8.50	18.00	Built-up
61	5.400	5.540	0.14	9.50	18.00	LHS River
62	5.540	5.600	0.06	9.50	16.00	Built-up
63	5.600	5.700	0.10	6.50	16.00	Built-up
64	5.700	5.800	0.10	8.90	16.00	Built-up
65	5.800	5.825	0.03	15.80	16.00	Built-up RHS
66	5.825	5.900	0.07	8.50	16.00	Built-up RHS
67	5.900	6.000	0.10	6.00	18.00	Built-up RHS
68	6.000	6.060	0.06	5.60	18.00	Open Area
69	6.060	6.100	0.04	5.60	18.00	Open Area
70	6.100	6.200	0.10	6.00	18.00	Open Area
71	6.200	6.300	0.10	6.50	18.00	Open Area
72	6.300	6.400	0.10	7.70	18.00	Open Area
73	6.400	6.500	0.10	7.80	18.00	Open Area
74	6.500	6.600	0.10	6.80	18.00	Open Area
75	6.600	6.700	0.10	8.20	18.00	Open Area
76	6.700	6.800	0.10	7.40	18.00	Open Area
77	6.800	6.900	0.10	8.50	18.00	Open Area
78	6.900	7.000	0.10	6.30	18.00	Open Area
79	7.000	7.100	0.10	8.70	18.00	Open Area
80	7.100	7.200	0.10	8.40	18.00	Open Area
81	7.200	7.300	0.10	5.10	18.00	Open Area
82	7.300	7.400	0.10	5.50	18.00	Open Area
83	7.400	7.500	0.10	13.70	18.00	Open Area
84	7.500	7.600	0.10	16.70	16.70	Open Area
85	7.600	7.700	0.10	18.60	18.60	Open Area
86	7.700	7.730	0.03	20.60	20.60	Open Area
87	7.730	7.800	0.07	20.60	29.50	Open Area with Truck Lay-By
88	7.800	7.835	0.04	22.00	27.00	Open Area with Truck Lay-By
89	7.835	7.900	0.06	8.80	27.00	Open Area with Truck Lay-By
90	7.900	7.970	0.07	6.00	27.00	Open Area with Truck Lay-By
91	7.970	8.000	0.03	6.00	18.00	Open Area
92	8.000	8.100	0.10	6.00	18.00	Open Area
93	8.100	8.200	0.10	7.00	18.00	Open Area
94	8.200	8.300	0.10	6.00	16.00	Built-up
95	8.300	8.350	0.05	9.70	16.00	Built-up
96	8.350	8.400	0.05	9.70	16.00	Built-up
97	8.400	8.415	0.01	7.50	16.00	Built-up
	Total Length		**8.415**			

6.4 Cross Sectional Details

2-lane with paved shoulder road is proposed for the project highway as per traffic analysis and the proposed pavement type is flexible in entire.

Typical Cross section for the project road section has been provided in the Appendix-03.

Table 6.2: Summary of proposed Typical Cross-sections

Sr. No.	TCS Type	Length (km)	TCS Description
1	TCS 1	3.675	Overlay/Widening (Built-up Section Both side drain)
2	TCS 2	0.520	Overlay/Widening (Built-up Section one side drain)
3	TCS 3	3.270	Overlay/Widening
4	TCS 4	0.600	New Construction/Reconstruction
5	TCS 5	0.160	New Construction
6	TCS 6	0.150	LHS Protection
7	No Proposal	0.040	
Grand Total		**8.415**	

Table 6.3: Typical Cross-sections Chainage Wise

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type	Remark
1	0.000	0.040	0.040	-	Length of Junction Considered in Bilasipura-Chapar-Tulungia-Jogighopa-Gendera-Paikan-Dudhnoi-Guwahati Road Project.
2	0.040	0.650	0.610	1	Overlay/Widening (Built-up Section)
3	0.650	1.360	0.710	1	Overlay/Widening (Built-up Section)
4	1.360	1.700	0.340	3	Overlay/Widening
5	1.700	2.160	0.460	1	Overlay/Widening (Built-up Section)
6	2.160	2.400	0.240	2	Overlay/Widening (Built-up Section)
7	2.400	3.390	0.990	1	Overlay/Widening (Built-up Section)
8	3.390	3.550	0.160	2	Overlay/Widening (Built-up Section)
9	3.550	3.650	0.100	3	Overlay/Widening
10	3.650	3.740	0.090	4	New Construction
11	3.740	3.900	0.160	5	New Construction
12	3.900	4.230	0.330	4	New Construction/Reconstruction
13	4.230	4.525	0.295	1	Overlay/Widening (Built-up Section)

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type	Remark
14	4.525	4.600	0.075	1	Overlay/Widening (Built-up Section)
15	4.600	4.720	0.120	2	Overlay/Widening (Built-up Section)
16	4.720	5.200	0.480	3	Overlay/Widening
17	5.200	5.380	0.180	4	New Construction
18	5.380	5.530	0.150	6	LHS Protection
19	5.530	5.900	0.370	1	Overlay/Widening (Built-up Section)
20	5.900	8.250	2.350	3	Overlay/Widening
21	8.250	8.415	0.165	1	Overlay/Widening (Built-up Section)
		Total Length	**8.415**	**Km.**	

6.4.1 Lane Width

The width of a basic traffic lane is taken to be 3.5 m. Thus, for 2-lane carriageways, width is taken as 7.0 m.

6.4.2 Shoulders

Proposed Width of Shoulder is tabulated below:

Table 6.4: width of shoulders

Sr. No.	Type of Section	Width of Earthen Shoulder (m)	Width of Paved Shoulder (m)
1.	TCS 1	-*	2.50
2.	TCS 2	1.0	1.50
3.	TCS 3	1.0	1.50
4.	TCS 4	1.0	1.50
5.	TCS 5	-*	1.50
6.	TCS 6	1.0	1.50

Note: * No Earthen Shoulder in Typical Cross section (TCS) drawings where drain has been proposed on any side in the TCS.

6.4.2.1 Side Slopes

For fill sections, the following side slopes are proposed:

- Embankment height up to 3.0 m - 2H: 1V
- Embankment height from 3.0 m to 6.0 m - 1.5H: 1V
- Embankment height exceeding 6.0 m-To be designed based on IRC-75.
  Cut slopes (If Applicable) will be as follows:
- Soil - 2H: 1V (For Cutting Height less than 7 m), for details Ref-TCS drawing

- Soil - 1H: 1V (For Cutting Height greater than 7 m), for details Ref-TCS drawing

6.4.3 Camber/Cross-fall

Each carriageway will have unidirectional cross-fall. The cross-fall for the flexible pavement/paved shoulder is 2.5% and for earthen shoulders the cross-fall is 3.5 %.

6.5 Pavement Design

Pavement is the most significant component of a road and therefore its design strengths must be assured to support the projected traffic loading throughout the design period. Its cost represents a major proportion of the total construction cost.

Flexible pavement shall be provided for the entire length of project highway.

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted

6.5.1 Design Traffic

For the purpose of structural design of pavement, only the number of commercial vehicles weighing three tones or more and their axle loads are considered. The Annual Average Daily Traffic on base year, from traffic analysis is given in Table below.

Table 6.5: AADT in Base year (2018)

Location	AADT	
	No. of vehicles	PCU
At km 3+500 (Near Damra A.S.A. Playground)	5373	4573

6.5.2 Design Life

For the design of pavement, the design life is defined in terms of the cumulative number of standard axles that can be carried before strengthening of the pavement is necessary. For this project design life of the flexible pavement has been considered as 20 years.

6.5.3 Vehicle Damage Factors

The VDF varies with the vehicle axle configuration, axle loading, terrain, type of road and from region to region. The vehicle damage factors arrived at and adopted are presented in the Table below.

Table 6.6: Vehicle Damage Factors

TYPE OF VEHICLES	VDF		
	UP	DOWN	MAX
M-Axle	8.655	4.084	8.655
3-Axle Truck	5.497	3.706	5.497
2-Axle Truck	2.619	3.738	3.738
Bus	0.334	0.741	0.741
Mini Bus	0.021	0.085	0.085
LCV	0.012	0.019	0.019

6.5.4 MSA Calculation

The design traffic is considered in terms of the cumulative number of standard axles to be carried during the design life of the road. The design traffic in terms of Million Standard Axles is presented in the Table below.

Table 6.7: Traffic in Million Standard Axles

Sr. No	Station	Calculated MSA on year 2043 (20th Design Year)
1	At km 3+500 (Near Damra A.S.A. Playground)	3.14

6.5.5 CBR Value

Effective CBR value of 7% is adopted in pavement design.

6.5.6 Crust Compositions for new construction

The general specification sections and characterization of material proposed for the design of pavement are presented in Table below.

Table 6.8: Proposed Flexible Pavement composition

Section	Design Period (Years)	Calculated MSA	Adopted MSA	CBR (%)	Pavement Crust Compositions				
					BC (mm)	DBM (mm)	WMM (mm)	CTSB (mm)	Total (mm)
Dudhnoi-Dainadubi	20	3.14	20	7	30	50	150	200	430

6.5.7 Crust Compositions for overlay

For Overlay of the existing pavement the overlay design pavement crust is presented in Table below.

Table 6.9: Proposed Overlay

Overlay	BC (mm)	DBM (mm)	Total (mm)
	30	50	80

6.6 Junctions Improvement

Road junction/intersection is a key element of highway design. The efficiency, safety, speed, cost of operation and capacity of road system very much depends on the intersection design. The choice between an at-grade and grade separated junctions at a particular site depends upon various factors such as traffic, economy, safety, aesthetic delay etc. Grade separated junctions generally are more expensive initially and are justified in certain situations from safe operation of traffic (IRC: 62 – 1976). The main objective of intersection design is to reduce the severity of potential conflicts between motor vehicles, buses, trucks, bicycles, pedestrians and facilities while facilitating the convenience, ease and comfort of people traversing the intersections. The design should be fitted closely to the natural transitional paths and operating characteristics of the users.

There total 30 junctions of which 1 is Major junction & 29 are Minor Junction/Cross Road. List of Junction is given in the table below:

Table 6.10: List of Junctions

Sl. No	Design Chainage (Km.)	Classification of crossroad	Type of Junction (T, Y)	Type of Cross Road	Side	Road Leading to	Remarks
Major Junctions							
1	0+000	Junction of NH-217 & NH-17	+ Junction	2-Lane BT	Four Sides	Back side Goalpara, RHS-Paikan, LHS-Guwahati	

Sl. No	Design Chainage (Km.)	Classification of crossroad	Type of Junction	Type of Cross	Side	Road Leading to	Remarks
Minor Junctions/Cross Roads							
1	0.170	Village Road	T Junction	BT Road	LHS	To Colony	
2	0.305	Village Road	T Junction	BT Road	LHS	To Colony	
3		Village Road	T Junction	BT Road	RHS	To Colony	
4	0.470	Village Road	T Junction	BT Road	LHS	To Colony	
5	0.530	Village Road	T Junction	BT Road	RHS	To Milan Path	
6	0.680	Village Road	T Junction	BT Road	LHS	To Colony	
7	0.705	Village Road	T Junction	BT Road	RHS	To Colony	
8	0.800	Village Road	T Junction	BT Road	RHS	To Colony	
9	0.840	Village Road	T Junction	BT Road	LHS	To Colony	
10	1.010	Village Road	T Junction	BT Road	LHS	To Colony	
11	1.020	Village Road	T Junction	BT Road	RHS	To Colony	
12	1.180	Village Road	T Junction	BT Road	RHS	To Jyoti Chira Mill	
13	1.240	Village Road	T Junction	BT Road	LHS	To Colony	
14	1.360	Village Road	T Junction	BT Road	LHS	To Colony	
15	1.370	Village Road	T Junction	BT Road	RHS	To Colony	
16	2.040	Village Road	Y Junction	BT Road	RHS	To Colony	
17	2.300	Village Road	T Junction	BT Road	Both	To Colony	
18	2.570	Village Road	T Junction	BT Road	RHS	To Colony	
19	2.640	Village Road	T Junction	BT Road	LHS	To Colony	
20	3.100	Village Road	T Junction	BT Road	LHS	To Colony	
21		Village Road	T Junction	BT Road	RHS	To Colony	
22	4.100	Village Road	Y Junction	BT Road	RHS	To Bakrapur	
23	4+540	Village Road	T Junction	BT Road	LHS	To Damra village	
24	5.140	Village Road	T Junction	BT Road	RHS	To Colony	

Sl. No	Design Chainage (Km.)	Classification of crossroad	Type of Junction	Type of Cross...	Side	Road Leading to	Remarks
25	5.500	Village Road	T Junction	BT Road	RHS	To Colony	
26	5.800	MDR	T Junction	BT Road	RHS	To Laskerpara village	
27	6.390	Village Road	T Junction	BT Road	LHS	Village road	
28	7.880	Village Road	Y Junction	BT Road	LHS	Village road	
29	8.110	Village Road	T Junction	BT Road	RHS	Village road	

6.7 Preconstruction Activities (Land Acquisition, Tree Felling & Utility Shifting)

Land Acquisition, Tree Felling & Utility Shifting summary is tabulated below:

Table 6.11: Cost Abstract of Preconstruction Activities

Sl. NO.		ITEM	Unit	Quantity	Rate	Amount (Rs)	Amount in Crores
1	1.a	Land Acquisition (Realignment & Widening)	Ha.	**6.58**	19612343	144739092.72	**14.47**
2	2.a	Tree Felling	No.	570.00	811.02	462279.00	**0.05**
	2.b	Tree Plantation with tree guard and maintenance (Including 1 year's maintenance)	No.	5700.00	1763.00	10049100.00	**1.00**
	2.c	Utility Shifting (Electrical)		as per Estimate received		47286643.00	**4.73**
	2.d	Utility Shifting (PHE)		as per Estimate received		5293000.00	**0.53**
						Total	***20.78***

6.8 Proposal for structures

The detail of proposal of structures is provided in the table below:

Table-6.12: Summary of CD Structure on the proposed alignment

SUMMARY OF STRUCTURES									
Type of Structure	Existing Nos.	Retained	Not Required	Widening	Reconstruction / Upgradation				New Proposal
					To HPC	To BC	To MNB	To MJB	
FOB	-	-	-	-	-	-	-	-	01
Vehicular Overpass	-	-	-	-	-	-	-	-	-
Vehicular Underpass	-	-	-	-	-	-	-	-	-
Major Bridge	-	-	-	-	-	-	-	-	-
Minor Bridge	2	-	-	1	-	-	1	-	02

SUMMARY OF STRUCTURES

Type of Structure	Existing Nos.	Retained	Not Required	Widening	Reconstruction / Upgradation				New Proposal
					To HPC	To BC	To MNB	To MJB	
Slab Culvert	09	-	-	-	-	09	-	-	09
Box Culvert	-	-	-	-	-	-	-	-	-
HPC / Laid Pipe	-	-	-	-	-	-	-	-	-
Total	**11**	**0**	**0**	**1**	**10**				**12**

HPC - Hume Pipe Culvert

BC - Box Culvert

SC - Slab Culvert

MNB - Minor Bridge

MJB-Major Bridge

FOB – Foot Over Bridge

Table 6.13: Detailed proposal of structure

Sr. No.	Location		Details of Existing Structure					Details of Proposed Structure						Overall Length (m)	Remarks
	Existing Chainage	Design Chainage	Type of Structure	Span Arrangement (m)		Overall Width (m)	Condition of Structure	Recommended Proposal for Structure	Type of Structure	Span Arrangement (m)		Overall Width (m)			
1	2	3	4	5		6	7	8	9	10		11		12	13
1	0+800	0+800	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
2	2+345	2+345	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
3	3+380	3+385	RCC Slab Culvert	1	1.80	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
4	4+150	4+150	Minor Bridge	1	25.00	8.40	Poor	Reconstruction	Minor Bridge	1	25.00	16.0		32.80	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
5	-	4+445	-	-	-	-	-	New proposal	FOB (Steel)	1	15.00	16.0		37.00	Near School
6	5+515	5+515	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
7	5+900	5+915	RCC Slab Culvert	1	1.60	11.90	Poor	Reconstruction	Box Culvert	1	6.0	12.0		13.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
8	6+295	6+305	RCC Slab Culvert	1	1.00	12.00	Poor	Reconstruction	Box Culvert	1	3.0	12.0		10.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
9	6+435	6+445	RCC Slab Culvert	1	1.00	11.80	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction
10	6+800	6+805	Minor Bridge	3	9.00	8.00	Fair	Widening	Minor Bridge	3	9.00	8.0		39.00	Due to Condition of existing structure is fair, this Structure is recommended to widening
11	7+090	7+110	RCC Slab Culvert	1	1.50	11.90	Poor	Reconstruction	Box Culvert	1	2.0	16.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction

Sr. No.	Location		Details of Existing Structure					Details of Proposed Structure						Overall Length (m)	Remarks
	Existing Chainage	Design Chainage	Type of Structure	Span Arrangement (m)		Overall Width (m)	Condition of Structure	Recommended Proposal for Structure	Type of Structure	Span Arrangement (m)		Overall Width (m)			
1	2	3	4	5		6	7	8	9	10		11		12	13
12	8+355	8+410	RCC Slab Culvert	1	1.60	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0		9.00	Due to Condition of existing structure is poor this Structure is recommended to reconstruction

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6.9 Road Furniture and other Wayside Amenities

The road furniture's, traffic safety features and other facilities included in the design are:

- Road Markings
- Kilometer stones & hectometer stones
- Road signs (Cautionary, Mandatory and Informatory Signs)
- Crash Barrier

6.9.1 Road Markings

Road markings perform the important function of guiding and controlling traffic on a highway. The markings serve as psychological barriers and signify the delineation of traffic paths and their lateral clearance from traffic hazards for safe movement of traffic. Road markings are therefore essential to ensure smooth and orderly flow of traffic and to promote road safety. The Code of Practice for Road Markings, IRC: 35-2015 has been used in the study as the design basis. The location and type of marking lines, material and colour is followed using IRC: 35-2015 – "Code of Practice for Road Markings".

Edge Marking: Continuous 0.15m wide white strip both side at road edge throughout the length,

6.9.2 Road Signs (Cautionary, Mandatory and Informatory Signs)

Cautionary, mandatory and informatory signs have been provided depending on the situation and function they perform in accordance with the IRC: 67-2012 guidelines for Road Signs.

- 90 cm equilateral triangle (Cautionary/Warning Sign)
- 60 cm equilateral triangle (Cautionary/Warning Sign)
- 60 cm circular (Mandatory/Regulatory Signs)
- 80 cm x 60 cm rectangular (Informatory Signs)
- 60 cm x 45 cm rectangular (Informatory Sign)
- 60 cm x 45 cm rectangular (Chevron Sign @ 15m c/c of outer side of each sharp curves)
- 60 cm x 60 cm square (Informatory Signs)
- 90 cm high octagon

6.9.3 Kilometer Stone Details

The details of kilo-meter stones are in accordance with IRC: 8-1980 guidelines. Kilo-meter stones are located on the left-hand side of the road as one proceeds from the station from which the Kilo-meter count starts. Kilo-meter stones shall be fixed at right angles to the Centre line of the carriageway.

6.9.4 Proposed Bus Shelters

Pick up bus shelters have been proposed at 2x3 locations. List of locations is given in table below:

Table 6.14: Proposed pick-up bus shelters locations

S. No.	Design Chainage		Location
	Left	Right	
1	0+040	0+060	Dudhnoi
2	4+950	5+110	Near School

3	5+750	5+850	Damra
4	8+250	8+300	Daindubi

6.9.6 Proposed Toll Plaza

Nil

6.9.7 Proposed Truck Lay Bye

Table 6.15: Proposed Truck Lay Bye locations

Sl. No.	Design Chainage (m)	Side	Nearest Village
1	3900	LHS	Bakrapur
2	7850	RHS	Dainadubi

6.9.8 Metal Beam Crash Barriers

The safety measures shall be provided at all hazardous/sinking/land slide locations. The safety barriers (W-beam Crash barriers) shall also be provided at the following hazardous structure (Bridges, culverts) locations where the embankment height is greater than 3.0m. Details are tabulated below.

Table 6.16: Proposed location of Metal Beam Crash Barrier

LEFT SIDE			RIGHT SIDE			
From (Km.)	To (Km.)	Length (M)	From (Km.)	To (Km.)	Length (M)	Remark
2.326	2.341	15	2.326	2.341	15	High Embankment
2.350	2.365	15	2.350	2.365	15	High Embankment
3.390	3.405	15	3.390	3.405	15	High Embankment
3.841	4.084	243	3.841	4.084	243	High Embankment
4.084	4.134	50	4.084	4.134	50	High Embankment
4.166	4.216	50	4.166	4.216	50	High Embankment
5.894	5.909	15	5.300	5.340	40	High Embankment
5.922	5.937	15	5.894	5.909	15	High Embankment
6.000	6.100	100	5.922	5.937	15	High Embankment
6.285	6.300	15	6.000	6.100	100	High Embankment
6.310	6.325	15	6.100	6.280	180	High Embankment
6.426	6.441	15	6.285	6.300	15	High Embankment
6.450	6.465	15	6.310	6.325	15	High Embankment
6.736	6.786	50	6.426	6.441	15	High Embankment
6.825	6.875	50	6.450	6.465	15	High Embankment
7.091	7.106	15	6.736	6.786	50	High Embankment
7.115	7.130	15	6.825	6.875	50	High Embankment
7.632	7.811	179	7.091	7.106	15	High Embankment
		0	7.115	7.130	15	High Embankment
	TOTAL	**887**	**m**		**1560**	**m**

6.9.9 Lined drain

Lined drain has been proposed in Built-up and cut sections. The location of proposed Lined drain given below:

Table 6.17: Proposed Locations of Lined drain

Left			Right		
From Chainage (m)	To Chainage (m)	Length (m)	From Chainage (m)	To Chainage (m)	Length (m)
40	796	756	40	796	756
805	1360	555	805	1360	555
1700	2160	460	1700	2160	460
			2160	2340	180
			2349	2400	51
2400	3381	981	2400	3381	981
			3390	3550	160
3740	3900	160	3740	3900	160
4230	4600	370	4230	4600	370
			4600	4720	120
5530	5900	370	5530	5900	370
8250	8406	156	8250	8406	156
Total		**3808**	**Total**		**4319**

The above locations are minimum. Additional locations if any required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work.

6.9.10 Retaining Wall

Reinforced earth wall has been proposed at high embankment locations to restrict the toe line of the embankment. Locations of retaining wall is given below:

Table 6.18: Proposed Retaining Wall

Sl. No.	Left Side			Right Side			Remark
	From (Ch.)	To (Ch.)	Length	From (Ch.)	To (Ch.)	Length	
1	5380	5530	150				LHS Dudhnoi River
TOTAL LENGTH (m)			**150**				

6.9.11 Toe Wall

PCC Toe wall has been proposed to restrict the toe line of the embankment and also restrict to right of way in 1760m length. Locations of toe wall is given below:

Table 6.19: Proposed Toe Wall

Left Side			Right Side		
From	To	Length	From	To	Length
6000.00	6850.00	850.00	5360.00	5420.00	60.00
			6000.00	6850.00	850.00
Total		**850.00**			**910.00**

6.9.10 Foot Over Bridge

Foot over Bridge has been proposed at km 4+445. This location is situated near the school and it was also recommended in stakeholders meeting. Details of FOB are presented below: -

Table 6.20: Proposed Locations of Lined drain

Design Chainage	Recommended Proposal for Structure	Type of Structure	Span Arrangement (m)		Overall Width (m)	Overall Length (m)
4+445	New proposal	FOB (Steel)	1	15.00	16.0	37.00

6.9.11 Utility Service Duct

Utility Service Duct has been proposed along the alignment in Built-ups for utility services in 7.807km length. The location of Utility Service Duct given below:

Table 6.21: Proposed Locations of Lined drain

Left			Right		
From Chainage (m)	To Chainage (m)	Length (m)	From Chainage (m)	To Chainage (m)	Length (m)
40	796	756	40	796	756
805	1360	555	805	1360	555
1700	2160	460	1700	2160	460
			2160	2340	180
			2349	2400	51
2400	3381	981	2400	3381	981
			3390	3550	160
4230	4600	370	4230	4600	370
			4600	4720	120
5530	5900	370	5530	5900	370
8250	8406	156	8250	8406	156
Total		**3648**	**Total**		**4159**

The above locations are minimum. Additional locations if any required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work. Lined Drain with Utility Service Duct proposed in Built-up only.

CHAPTER-7
ENVIRONMENTAL ASSESSMENT

7.1 ENVIRONMENTAL IMPACT ASSESSMENT

The improvement proposal primarily specifies the geometric improvements with widening of existing road to two lane with paved shoulders and utilising existing alignment to the extent possible **"Overlay & Widening of the existing two lane road to Two – Lane with Paved Shoulders, Dudhnoi to Dainadubi. Commencing from Chainage 0+000 (Latitude: 25.982972°and Longitude: 90.782326°) at Dudhnoi (Junction with NH-17) in Goalpara District (Assam) and End at Chainage 8+415 (Latitude- 25.909109° & Longitude- 90.774583°) in Dainadubi at State border of Meghalaya & Assam".**

The total design length of road is 8.415 km.

The environmental impacts associated with the proposed upgradation are construction related impacts associated with road widening projects. These are proposed to be addressed through good engineering practices and adoption of environmental management measures proposed in the Environmental Management Plan (EMP) for the corridor. **The EMP budget of INR 0.14 Crore for this project road** include the management measures and provision for environmental monitoring.

7.2 LAND ACQUISITION AND RESETTLEMENT IMPACTS

Being a greenfield alignment there no land width available. Thus, For the improvement and proposed widening of the Project highway extra lang width will be required. Hence, proposed ROW will be as per the table below:

Table 7.1: Proposed ROW

Sr.No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	PROW (m)	Remarks
1	0.040	0.100	0.06	16.00	Built-up
2	0.100	0.200	0.10	16.00	Built-up
3	0.200	0.300	0.10	16.00	Built-up
4	0.300	0.400	0.10	16.00	Built-up
5	0.400	0.500	0.10	16.00	Built-up
6	0.500	0.600	0.10	16.00	Built-up
7	0.600	0.700	0.10	16.00	Built-up
8	0.700	0.800	0.10	16.00	Built-up
9	0.800	0.900	0.10	16.00	Built-up
10	0.900	1.015	0.12	16.00	Built-up
11	1.015	1.100	0.09	16.00	Built-up
12	1.100	1.200	0.10	16.00	Built-up
13	1.200	1.300	0.10	16.00	Built-up
14	1.300	1.360	0.06	16.00	Built-up
15	1.360	1.400	0.04	18.00	Built-up
16	1.400	1.500	0.10	18.00	Built-up
17	1.500	1.600	0.10	18.00	Built-up
18	1.600	1.700	0.10	18.00	Built-up

Sr.No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	PROW (m)	Remarks
19	1.700	1.800	0.10	16.00	Built-up
20	1.800	1.900	0.10	16.00	Built-up
21	1.900	2.000	0.10	16.00	Built-up
22	2.000	2.160	0.16	16.00	Built-up
23	2.160	2.200	0.04	14.00	Built-up
24	2.200	2.300	0.10	14.00	Built-up
25	2.300	2.400	0.10	14.00	Built-up
26	2.400	2.500	0.10	16.00	Built-up
27	2.500	2.600	0.10	16.00	Built-up
28	2.600	2.700	0.10	16.00	Built-up
29	2.700	2.800	0.10	16.00	Built-up
30	2.800	2.900	0.10	16.00	Built-up
31	2.900	3.000	0.10	16.00	Built-up
32	3.000	3.140	0.14	16.00	Built-up
33	3.140	3.200	0.06	16.00	Built-up
34	3.200	3.300	0.10	16.00	Built-up
35	3.300	3.400	0.10	16.00	
36	3.400	3.500	0.10	14.00	
37	3.500	3.600	0.10	14.00	
38	3.600	3.700	0.10	14.00	
39	3.700	3.800	0.10	30.00	Realignment
40	3.800	3.900	0.10	30.00	Realignment
41	3.900	4.000	0.10	30.00	Realignment
42	4.000	4.050	0.05	30.00	Realignment
43	4.050	4.100	0.05	30.00	Realignment
44	4.100	4.200	0.10	30.00	Realignment
45	4.200	4.260	0.06	18.00	
46	4.260	4.300	0.04	16.00	
47	4.300	4.400	0.10	16.00	
48	4.400	4.440	0.04	16.00	
49	4.440	4.500	0.06	16.00	
50	4.500	4.600	0.10	16.00	
51	4.600	4.700	0.10	16.00	
52	4.700	4.740	0.04	16.00	
53	4.740	4.800	0.06	18.00	
54	4.800	4.900	0.10	18.00	
55	4.900	5.000	0.10	18.00	
56	5.000	5.080	0.08	18.00	Built-up
57	5.080	5.100	0.02	18.00	Built-up
58	5.100	5.200	0.10	18.00	Built-up
59	5.200	5.300	0.10	18.00	Built-up
60	5.300	5.400	0.10	18.00	Built-up

Sr.No	Design Chainage From(km)	Design Chainage To(km)	Design Length (km)	PROW (m)	Remarks
61	5.400	5.540	0.14	18.00	LHS River
62	5.540	5.600	0.06	16.00	Built-up
63	5.600	5.700	0.10	16.00	Built-up
64	5.700	5.800	0.10	16.00	Built-up
65	5.800	5.825	0.03	16.00	Built-up RHS
66	5.825	5.900	0.07	16.00	Built-up RHS
67	5.900	6.000	0.10	18.00	Built-up RHS
68	6.000	6.060	0.06	18.00	Open Area
69	6.060	6.100	0.04	18.00	Open Area
70	6.100	6.200	0.10	18.00	Open Area
71	6.200	6.300	0.10	18.00	Open Area
72	6.300	6.400	0.10	18.00	Open Area
73	6.400	6.500	0.10	18.00	Open Area
74	6.500	6.600	0.10	18.00	Open Area
75	6.600	6.700	0.10	18.00	Open Area
76	6.700	6.800	0.10	18.00	Open Area
77	6.800	6.900	0.10	18.00	Open Area
78	6.900	7.000	0.10	18.00	Open Area
79	7.000	7.100	0.10	18.00	Open Area
80	7.100	7.200	0.10	18.00	Open Area
81	7.200	7.300	0.10	18.00	Open Area
82	7.300	7.400	0.10	18.00	Open Area
83	7.400	7.500	0.10	18.00	Open Area
84	7.500	7.600	0.10	16.70	Open Area
85	7.600	7.700	0.10	18.60	Open Area
86	7.700	7.730	0.03	20.60	Open Area
87	7.730	7.800	0.07	29.50	Open Area with Truck Lay-By
88	7.800	7.835	0.04	27.00	Open Area with Truck Lay-By
89	7.835	7.900	0.06	27.00	Open Area with Truck Lay-By
90	7.900	7.970	0.07	27.00	Open Area with Truck Lay-By
91	7.970	8.000	0.03	18.00	Open Area
92	8.000	8.100	0.10	18.00	Open Area
93	8.100	8.200	0.10	18.00	Open Area
94	8.200	8.300	0.10	16.00	Built-up
95	8.300	8.350	0.05	16.00	Built-up
96	8.350	8.400	0.05	16.00	Built-up
97	8.400	8.415	0.01	16.00	Built-up
	Total Length		**8.375**		

A resettlement budget including compensation for the affected land & structures, assets within the affected properties and rehabilitation and resettlement assistance has been included in

the estimate. Any unforeseen impacts on resettlement during implementation will be taken up in accordance with the Resettlement Policy Framework (RPF) of the Project.

Table 7.2A: Summary of Land Acquisition

Sr. No.	Type of Land	Area (Ha)
1	Private Land	7.38
2	Government Land	0.00
Total		**7.38 Ha.**

Table 7.2: Summary of Land Acquisition Cost & Utility Shifting etc.

Step	Sequence	Area of Land (In Hectare)	Avg. Rate	Amount	Amount in Cr.	Remark
1	Basic Market value of Private Land	7.380	5377219	39684146	3.97	
2	In accordance with sub-section(1) of section 26, read with sub-section (3) of section 26 and section 28 of the RFCTLARR act 2013					
3	Apply the multiplication factor to amount determoned in step 1 in terms of subsection (2) of section 26 of the RFCTLARR act 2013			59526219	5.95	Multiplication Factor@1.50
4	Calculate value of assets (Building, Trees) attached to the land under acquisition in terms of section 29 of RFCTLARRact 2013			10462279	1.05	
5	Add the amount determined under step 2 and step 3 and then provide for 100% solatium on the amount so arrived:			139976995	14.00	
6	Calculate the amount of interest on Basic Market Value @ 12% in terms of section 30(3) of the act:			4762097	0.48	
7	**Total Compensation amount (In Cr.)**			144739093	14.47	
9	**Total (In Cr.)**	**7.380**			**14.47**	

It is evident that the above-mentioned land is desired for the development of the project highway, the number of affected structures & land loosening impact on the owners, the vehicle

operating costs across the development of project road and saving in the VOCs & VOTs are some of the key points to be taken care in Environmental & Social Impact assessment. the voc cost reduction reduces the overall expenditures caused due to non-development of the project road. Impact of the tree felling across the project alignment has been suitably assessed and remunerated back to mother nature by mandatory afforestation measures. these measures are discussed in detail in Environment Management Plan for the project Road development.

CHAPTER-8
COST ESTIMATE

8.1 General

Cost estimation is an important component of the study as it provides insights for proper planning of project execution. Detailed Cost estimates are prepared based on the detailed engineering designs and detailed drawings.

8.2 Quantification

The construction items covered in cost estimates include are as follows:

1. Site clearance & Dismantling
2. Earthwork
3. Sub-Base, Base Courses (Granular)
4. Bituminous Courses / Concrete Pavements
5. Cross Drainage Structures
   5.1 Culverts
   5.2 Minor Bridge
6. Drainage & Protection Works
7. Traffic Signs, Road Markings & Appurtenances
8. Miscellaneous

The items of work have been given only in summarized form without detailed description of work and materials. All individual items however have referenced to the relevant Sections/Clauses of Specifications. The Specification Clauses cover input details, method of construction, mode of measurement etc.

8.3 Centages

As per MoRT&H circular, the Cost estimates incorporates other provisions besides the Civil works and comprises of following parts as under:

i. GST - @18% of Civil cost (if not included in the rate)
ii. Contingencies @ 1% of Civil cost
iii. Supervision charges @ 3% of Civil cost
iv. Agency charges @ 3% of Civil cost

The Goods and Service tax has been increased from 12% to 18% vide Notification No. 03/2022-Centra Tax (Rate) dtd. 13th July 2022, Government of India, in the Ministry of Finance (Department of Revenue).

8.3 Rate Analysis and Cost Estimate

Rates have been considered directly from Public Works (Building & NH) Department SOR for Assam 2020-21. For rates not available in the SOR, analysis has been done as per Standard Data Book with basic rates of labour, equipment and machinery considered from resource rates of Assam. **Details of Rate Analysis are presented in Volume-VI.**

The Unit Rates arrived through the detailed rate analysis is used for the preparation of Cost Estimate. Cost estimate & BOQ are presented in **Volume-VII & VIII** respectively in a combined booklet with Rate Analysis.

Table 8.1: Cost Abstracts

S.N.	PARTICULAR	Amount (INR)	Amount in Cr	Weightage w.r.t. to civil cost %	Cost per Km. Cr.
1	BILL NO: 1 SITE CLEARANCE AND DISMANTLING	986878	0.10	0.23%	0.01
2	BILL NO: 2 - EARTHWORK	25138414	2.51	5.81%	0.30
3	BILL NO: 3 - SUB-BASE AND BASE COURSES				
	a) CTSB	43853895	4.39	10.14%	0.52
	b) WMM	24561010	2.46	5.68%	0.29
4	BILL NO: 4 (A) - BITUMINOUS WORKS - FLEXIBLE PAVEMENT				
	a) DBM	42853863	4.29	9.91%	0.51
	b) BC	26824167	2.68	6.20%	0.32
	c)Tack Coat	1260619	0.13	0.29%	0.01
	d) Prime Coat	2791370	0.28	0.65%	0.03
	BILL NO: 4 (B) - RIGID PAVEMENT	0	0.00	0.00%	0.00
5	BILL NO: 5 CROSS DRAINAGE WORKS				
	a) Box Culvert (09 Nos, New/Reconstruction)	28205596	2.82	6.52%	0.34
	b) Minor Bridges (02 Nos, New construction/Widening)	33977342	3.40	7.86%	0.40
	c) FOB (01 No. New construction)	12000000	1.20	2.77%	0.14
6	BILL NO:6 DRAINAGE & PROTECTION WORK (TOE WALL/RET.WALL/ BREAST WALL)				
	a) Drain at edge of pavement along hill side/Built-up	70596801	7.06	16.32%	0.84
	b) Metal Beam Crash Barrier	8503325	0.85	1.97%	0.10
	c) Retaining Wall	7365201	0.74	1.70%	0.09
	d) Stone pitching with Toe Wall	9054830	0.91	2.09%	0.11
7	BILL NO: 7 - TRAFFIC SIGNS, ROAD MARKINGS AND APPURTENANCES	6504760	0.65	1.50%	0.08
8	BILL NO: 8 - MISCELLANEOUS ITEMS				
	a) Passenger Shelter	2127064	0.21	0.49%	0.03
	b) Truck Lay Bye	8669951	0.87	2.00%	0.10
	c) Utility Service Duct	2765700	0.28	0.64%	0.03
	d) Public Toilet	900000	0.09	0.21%	0.01
	e) Street Lighting & Allied works	6625000	0.66	1.53%	0.08
	f) Major/Minor Junctions & Cross Road Improvement	63861437	6.39	14.77%	0.76
	g) Safety and traffic management etc.	3080000	0.31	0.71%	0.04
A	**Civil Cost As Per SOR 2020-21 Exclusive GST**	**432507224**	**43.25**	**100.00%**	**5.14**
B	**Utility Shifting**				
B1	**Electrical**	**40073426**	4.01		

B2	**Water**	**4725893**	0.47		
B	**Cost of Utility Shifting**	**44799319**	4.48		
1	**Estimated Civil Cost/ Cost Put to Tender (A+B)**	**477306544**	**47.73**		
2	Price Escalation @ 5% of 1	23865327	2.39		
3	Maintainance Charges @2.5% of 1	11932664	1.19		
4	**Basic Project Cost (Inclusive of Civil Cost, Escalation and Maintenance Charges)**	**513104535**	**51.31**		
5	Contingencies @1% on 1	4773065	0.48		
6	**Basic Project Cost Including Contingencies**	**517877600**	**51.79**		
7	**GST @ 18% on 6**	**93217968**	**9.32**		
8	Construction Supervision Charges @ 3% of 1	2796539	0.28		
9	**Preconstruction Cost**				
	Land Acquisition Provisional Cost i/c removal of permanent structures	264739093	26.47		
	Tree Felling/Plantation	20000000	2.00		
	Total Preconstruction Cost	**284739093**	**28.47**		
10	Agency Charges on 6 @3% GST thereon @18% (Effective rate 3.54%)	18332867	1.83		
11	Agency Charges on 9 (LA Cost except in state of Assam and Uttarakhand) @1% plus GST thereon@18% (Effective rate 1.18%)	2847391	0.28		
12	**Grand Total (Project Cost)**	**919811457**	**91.98**		
13	**Total Cost /Km.**	**109306174**	**10.93**		

CHAPTER-9
ECONOMIC ANALYSIS

9.1 General

The objective of the cost benefit economic analysis is to maximize the returns on investments and to identify and quantify the benefits and costs associated with the project with respect to the different construction options to select the optimum solution and finally to ascertain the economic viability for the selected option in terms of its likely investment return potential. This is carried out to test whether the project roads are economically viable or not.

This cost-benefit economic feasibility study is carried out using the overall guidelines stipulated by the Indian Roads Congress (IRC) in their manual "Economic Evaluation of Highway Projects in India" (IRC-SP-30), as these are accepted by the Ministry of Road Transport & Highways (MORTH) and National Highways Authority of India (NHAI) for highway projects in India.

The Name of the Project is Consultancy Services for Preparation of DPR for Economic Corridors, Inter Corridors and Feeder Routes to Improve the Efficiency of Freight Movement in India Under Bharatmala Pariyojna (Lot-01) - (Pkg-1B) - Dudhnoi – Dainadubi NH-217 Road from Km 0+000 to Km 8+415, Existing Length- 8+415 Km.

Project road lies in the Goalpara Districts of Assam State.

The project road passes through the built ups of Dudhnoi Town, Dudhnoi, Damra-Pat Para & Naka Makundi in Goalpara District of Assam and up to State border at Dainadubi in East Garo Hills district of Meghalaya.

Project road passes through the Goalpara Districts of Assam State. Surveyed length is 8.600 km (approx.) and Overall Design Length for Dudhnoi-Dainadubi is 8.415 Km.

Location map is shown in Figure below.

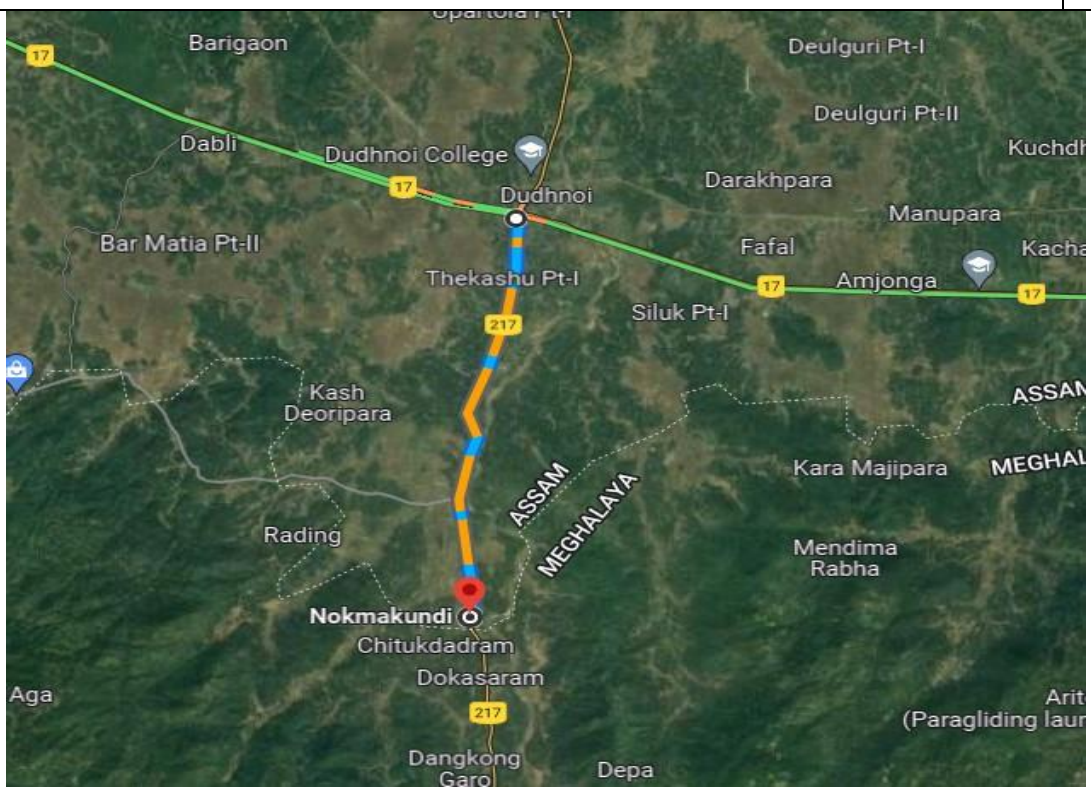

Figure 9.1: Project Road stretch

The proposed evaluation framework is based on a cost-benefit analysis, which sets a monetary value where possible on all economic and social costs and benefits over the lifetime of the project. The underlying principles for this analysis are as follows:

- The lifetime of a road project for the present analysis is considered as the period for which reliable traffic forecasts can be made. A discount rate is then applied to future economic costs and benefits to arrive at the Net Present Value (NPV) of the project. The Economic Internal Rate of Return (EIRR) of the project is also computed.
- To analyze the cash flow at constant prices, an allowance is made for relative price inflation.
- The discount rate is expressed in real terms.

The standard methodology used for the economic evaluation for transport projects has been adopted. Analysis is accomplished by determining the appropriate improvement proposal that leads to minimum total transport cost, which comprises of two basic components shown below.

Table 9.1 Total Transport Cost

Road Agency Costs	Road User Costs
• Construction • Maintenance	• Vehicle Operating Costs • Other user costs (like travel time costs) • Accidents

These costs are generated for every year of the analysis period (cost-benefit stream) from which economic indicator parameters that essential for viability of project namely Net Present Value (NPV), Economic Rate of Return (EIRR) and Benefit Cost Ratio (B/C) are the final economic outputs. NPV is the

present value of Net Benefits (NB) during the project period. EIRR is the discount rate at which the NPV of the Net Benefit (NB) is zero. Net Benefit is the cumulative sum of the difference between yearly benefit and yearly costs incurred after discounting.

$$NB = \sum_{n=1}^{M} (Benefit(n) - Costs(n))$$

Savings from vehicle emission reduction and less energy consumption due to improved facility are also important economic savings which are possible to calculate but these quantities are not converted to economic cost. Hence, these benefits are not included.

The transportation cost, as such are different for improvement scenario and without improvement scenario. In the "without improvement" alternative, the transportation cost will include the cost of maintenance of the facility and road users' costs incurred in the future. Both the maintenance and road users' cost are quite heavy in case of "without improvement" scenario as compared to "with improvement" scenario.

The rate of pavement deterioration is directly affected by the standards of maintenance applied to repair defects on the pavement surfaces such as cracking, raveling, potholes, etc. and to preserve the structural integrity of the pavement. Figure 1.1 demonstrates the predicted trend in pavement performance represented by the riding quality that is often measured in terms of the international roughness index (IRI).

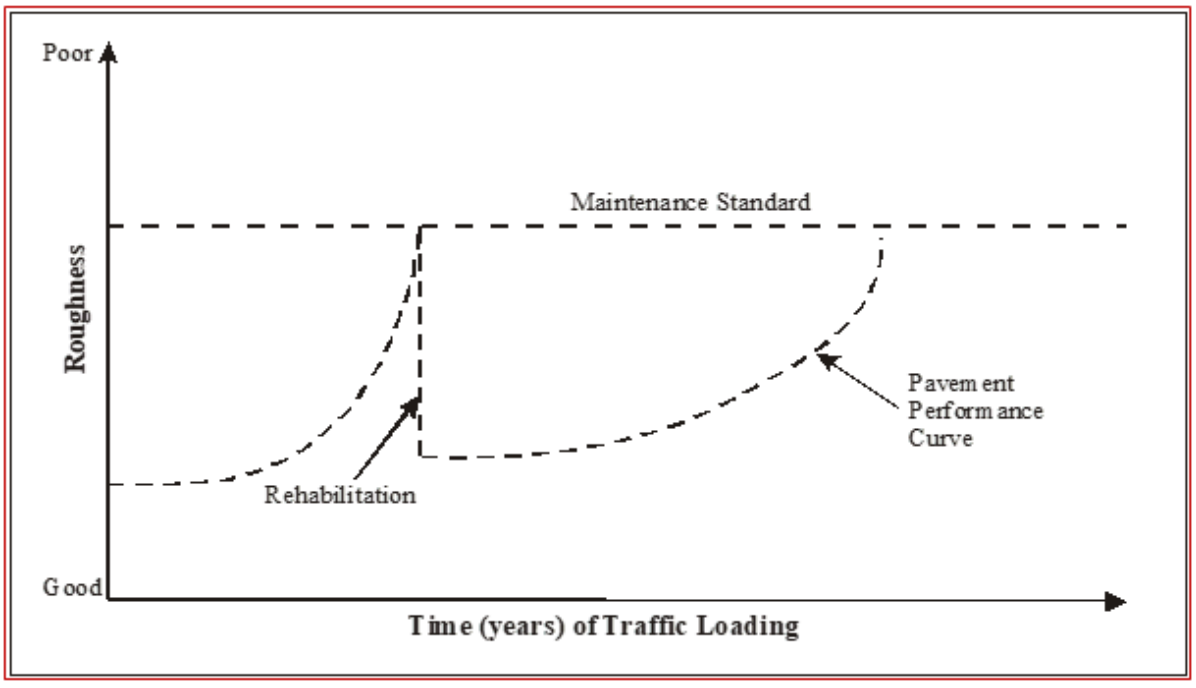

Fig 9.1 Predicted Trends in Pavement Performance

The reduced costs are treated as benefits calculated over the project life. The results are expressed in Economic Internal Rate of Return (EIRR) and Net Present Value (NPV). The economic analysis is carried out following IRC-SP-30(Economic Evaluation of Highway Projects). The model generates total transport costs (user plus agency cost) in "with" and "without" the improvement situation. The differences in costs due to road improvement (with the project) are considered as the benefit accruing from road improvement. The economic indicators such as the EIRR and NPV at the discount rate of 12 % are calculated.

To evaluate the pavement alternatives selected, analysis has been carried out using "present value" at each stage. This helps to compare the costs related to the development using a particular type of pavement on present value terms. For carrying out the same, all costs are estimated at the anticipated years and have been discounted to the present-day worth using a pre-determined discount rate.

The analysis period of the Project is taken as 20 years from the Project Road opening year 2024 as follows:

Base year - 2021

Construction Period	-	2023 to 2024 (One Years)
Project road opening to traffic	-	2024
End of Analysis Period	-	2043

The stepwise methodology is presented in Figure 9.2

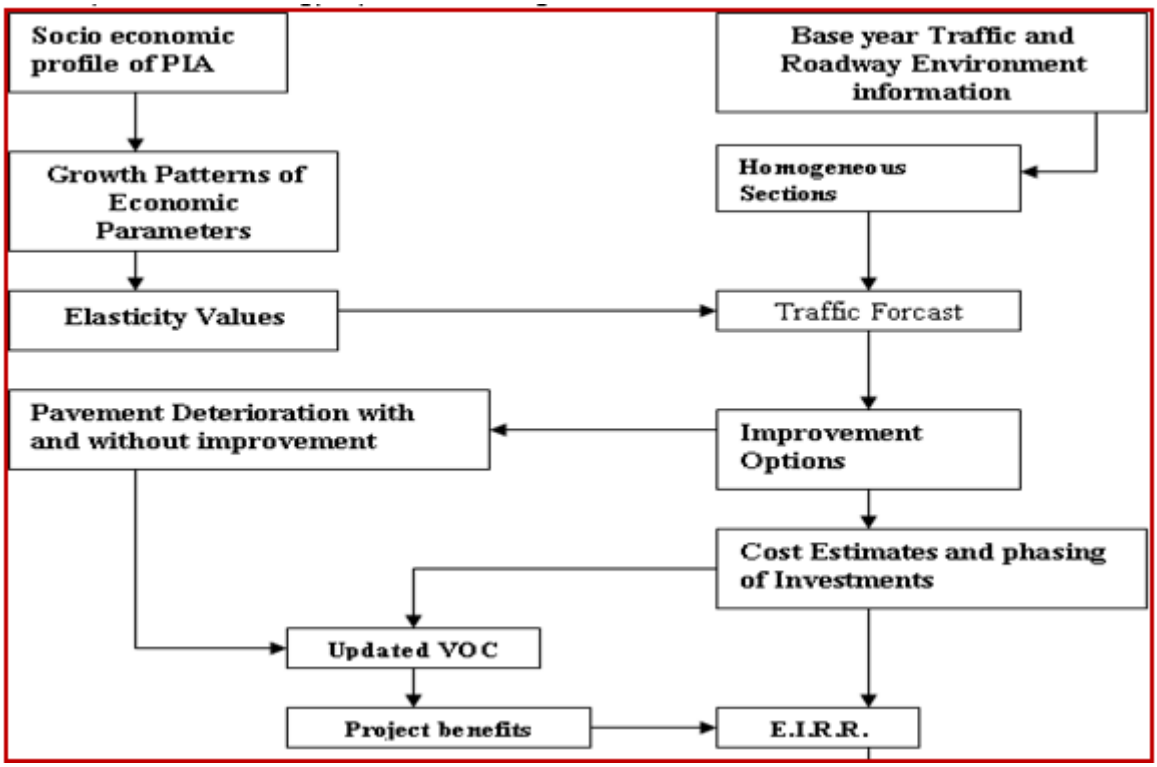

Fig 9.2stepwise method for economic analysis

9.3 Economic Cost

The cost of implementing a project to society is not necessarily the same as the costs in the marketplace. In terms of economic costs, such market or financial costs are devoid of any tax components and market imperfections. Thus, in the cost benefit analysis of an economic appraisal, financial costs have to be adjusted to derive the economic costs. In a project of the current nature, many items are used in the construction with tax components known for certain items and not for others.

The total project costs including construction, land acquisition, R&R, environmental costs etc. have been worked out and presented in the Cost Chapter. The routine, recurrent and periodic maintenance costs have been worked out based on the guidelines of MORTH for Highway Projects.

9.4 Basis of Analysis

Economic evaluation has been carried out based on incremental costs & benefits comparing the total net benefits in "without improvement" situation with "with improvement" situation. The term "without improvement" is defined as the base strategy for economic analysis i.e. without improvement situation. The term "with improvement" is defined as project road with 2-lane with Paved shoulder facility. Economic analysis has been carried out for three cases as listed below: -

- Case I when no Improvement has been suggested.
- Case II Un-Bypass able traffic will use the existing road.
- Case III Bypass construction completed & Past traffic has been diverted.

9.5 Input Parameters

Generally, no systematic and timely maintenance/Repair works have been executed in the past. However, for preliminary economic analysis, some reasonable assumptions were made by visual inspection for the data like rise and fall, curvature, super-elevation and the roughness IRI is also assumed as the survey is in progress.

9.5.1 General

The following general input values have been considered for the analysis.

Table 9.2 General Inputs

Discount Rate (%)	12%
Analysis Period (years)	20
Calendar Year of Initial Year	2022
Output Currency Name	Indian Rupees
Input Currency Name	Indian Rupees
Roughness index of Existing Road	4000 mm/km
Rise & Fall	10

Name	Speed Flow Type	Road Type	Surface Type	Length (Km)	Carriageway Width (m)	Shoulder Width (m)	AADT 2021 yr	
							VEH	PCU
Dudhnoi-Dainadubi	Two Lane Wide	NH-217	Bituminous / Earthen	8.415	7.00	Up to 1.5	5924	5042

9.6 Traffic

The Assignable traffic likely to use the Project Roads has already been discussed in the Traffic analysis chapter and this traffic has been used for the economic Analysis.

9.6.1 Capacity of the Roads

As per IRC 64 daily designs service volumes have been considered to determine the capacity of the project roads, which are based on Level of Service-B (Volume/Capacity of 0.5) and a peak hour share of 10%. It is also suggested that the capacity will be more by 15% with 1.5m paved shoulders. The two sets of data are compared in Table 8.4 Based on this comparison, maximum capacities as per IRC 64 are considered reasonable to use.

Table 9.4 Suggested Capacities for Plain/Rolling Terrain (PCU/Hr)

Road details	Maximum Capacities
	IRC-SP-30
Single Lane	600 (both Direction)
Two Lane	2000-3000 (both Direction)

9.6.2 Growth Rates

Traffic demand forecasting has been done for 20 horizon years using IRC:64 and Econometric modelling is attempted to estimate traffic demand forecasting considering a number of variables such as population, per capita income, state income (NSDP), and Past Vehicle registration data. Traffic growth rates are necessary to estimate the traffic levels in future on the project road are a product of economic factor of the influence area and elasticity of traffic demand. Normal growth scenario has been considered for Economic Analysis.

The growth rates used as an input to the model are as tabulated below. Detailed traffic forecast analysis carried out is presented in the Traffic Analysis chapter and its annexure. Traffic growth rates adopted for Economic Analysis are presented below Table 9.5 (Traffic Growth Rates).

Table 9.5 Traffic Growth Rates

Variable/Year	2024	2029	2034	2039	2044
Cars	5	5	5	5	5
Buses	5	5	5	5	5
LCV	5	5	5	5	5
HCV	5	5	5	5	5
MAV	5	5	5	5	5
Two Wheelers	5	5	5	5	5

Base year traffic as given in the Traffic report in the year 2020, considered in the economic analysis.

9.7 Project Costs

9.7.1 Capital cost

The capital costs of the Construction of the Project Road including the phasing of investment during the construction period have been calculated. The total capital costs (including road works, bridges,

culverts and utilities, R&R, Quality and Project development charges at current prices with contingency costs for road works and structures has been considered.

Table 9.6 Total Project Taken in the Analysis is as Follows

Construction Package/Option	Project Road	Widening/Lane Config.	Total Project Cost (Cr.)
H1	Dudhnoi - Dainadubi (NH-217)	2 Lane with Paved Shoulder	88.69

9.7.2 Phasing of Construction cost

The construction period has been taken as 2 years with construction cost distribution as shown in Table 9.7.

Table 9.7 Percentage Distribution of Cost

Year I	Year II
50	*50*

9.7.3 Maintenance Cost and Road User Cost

Routine maintenance cost that has been adopted for the analysis is

Routine Maintenance Costs

Existing Road Category : Rs. 2.5 Lakh/ Km / Year per Lane

Road User Costs

The economic cost inputs that are required for estimating road user costs are:

- Price of selected (popular) models, by vehicle type
- Tyre prices
- Fuel cost including oil
- Crew cost (wages of Drivers / Assistants)
- Time costs for:
  - Passengers
  - Freight (holding cost)

The analysis has been performed as per guidelines published in IRC–SP-30. To work out for vehicle Operation Cost for different categories of vehicles, IRC-SP-30 recommends a different set of equation for each type.

9.8 Economic Evaluation

Project Cost

The preliminary Cost of Construction is taken, as shown in **Table 9.6** above, for upgrading the existing road to 2-lane with Paved shoulder standards in the analysis with routine and maintenance costs.

Economic Analysis

The life cycle economic benefits and costs, NPV and IRR are calculated considering:

a) VOC savings as a Project benefit and
b) With all savings (VOC and Travel time) as a Project benefit.
c) Construction Costs

Summary of eco-analysis is attached in the following.

Table 9.8 Summary of NPV and EIRR of the Project Road

Section	EIRR (%)
Dudhanoi – Dainadubi Road	**11%**

Table 9.9 Statement of Cost and Benefit Analysis of Improvement of Project Road

Saving Stream vs Cost Streams Final Show (In Crore)								
Year	**VOC Existing**	**VOC after New Construction**	**Time Value**	**Maintenance Cost @ 3.5L per km per lane**	**Project Cost**	**Cost Stream**	**Benefit Stream**	**Saving Potential Reflected**
2022	15.78	13.74	0.00	3.07		3.07		3.07
2023	16.61	14.45	3.04	3.07	44.35	-41.27		-41.27
2024	17.47	15.20	3.19	3.07	44.35	-41.27		-41.27
2025	18.39	15.99	3.35	3.07		3.07	5.75	8.83
2026	19.36	16.82	3.52	3.07		3.07	6.06	9.13
2027	20.38	17.70	3.69	3.07		3.07	6.37	9.44
2028	21.46	18.63	3.88	3.07		3.07	6.70	9.77
2029	22.59	19.62	4.07	3.07		3.07	7.05	10.12
2030	23.79	20.65	4.28	3.07		3.07	7.41	10.48
2031	25.06	21.75	4.49	3.07		3.07	7.80	10.87
2032	26.40	22.91	4.71	3.07		3.07	8.20	11.28
2033	27.81	24.13	4.95	3.07		3.07	8.63	11.70
2034	29.30	25.42	5.20	3.07		3.07	9.08	12.16
2035	30.88	26.78	5.46	3.07		3.07	9.56	12.63
2036	32.55	28.22	5.73	3.07		3.07	10.06	13.13
2037	34.32	29.74	6.02	3.07		3.07	10.59	13.66
2038	36.19	31.35	6.32	3.07		3.07	11.15	14.22
2039	38.17	33.06	6.63	3.07		3.07	11.74	14.81
2040	40.26	34.86	6.96	3.07		3.07	12.36	15.44
2041	42.48	36.77	7.31	3.07		3.07	13.02	16.09
2042	44.83	38.79	7.68	3.07		3.07	13.72	16.79
2043	47.32	40.93	8.06	3.07		3.07	14.45	17.52
2044	49.96	43.20	8.47	3.07		3.07	15.23	18.30
							IRR	**11%**

**** All Amounts are in Crore.**

9.9 Project Viability & Conclusion

As economic internal rate of return is coming 11% (below from the standard requirement of 12%, for upgrading of the Project Road). Sensitivity Analysis is presented below:

Sensitivity	***EIRR***	***NPV (Cr)***
Level 1	11%	199.9
Level 2	11%	199.9
Level 3	11%	169.9
Level 4	10%	169.9

The IRR is below the standard requirement of 12% due to-

1. The length of the project alignment is very small.
2. Presence of already 2-Lane carriageway along the alignment.
3. Few locations with inferior geometrics along project alignment.

At the same time, it is important to mention that this road is serving for continuous built-up areas in the vicinity and also works as connecting route between existing NH-17 & Meghalaya state. Additionally, the project alignment is a National Highway. As per MoRTH circular dated 05.10.2012, minimum configuration of NH in P&R terrain will be 2L+PS. Also, we wish to mention that as per MoRTH circular for road capacity dated 26th May 2016, it is evident that the augmentation for the 4 laning is to be taken up after the traffic reaches beyond 10000 PCU. As per projected traffic, the traffic is 10482 in year 2036. Additionally, it may be understood that the design service volume of the four-lane road as per IRC: SP-84 is 20000 PCU. However, the traffic is only 14047 PCU in 20th year of Design life. The extra traffic higher than 10000 will slightly affect the level of service. Had the traffic crossed the threshold of 20000 PCU in any year, 4-laning would have been recommended. Therefore, two lane with paved shoulders is recommended at present analysis for design life.

It may also be mentioned, that the mode of the project is decided on the basis of recovery model. The recovery model is invariably dependent on revenue collection model. Since no toll plaza has been proposed in the project alignment, therefore the ***revenue model (Financial Analysis)*** cannot be generated. In view of this, it may be concluded that the expenses likely to be occurred for upgrading/improving the road geometrics or widening, whichever is applicable, will be ultimately the responsibility of the government. Therefore, the project is recommended to be taken up on EPC basis.

Appendix-I

Road Inventory Data Sheet

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
0.000	**0.100**	Plain	BU	BU	Dudhnoi	10.0	F	7.00	BT	Paved	1.800	P	Paved	1.200	P	0.0	0.0	0.000	7.00	Junction (Left side to Guwhati)
0.100	**0.200**	Plain	BU	BU	Dudhnoi	9.7	F	7.00	BT	Paved	1.500	P	Paved	1.200	P	0.0	0.0	0.000	7.00	Junction (Right side to Golpara)
0.200	**0.300**	Plain	BU	BU	Dudhnoi	15.7	F	7.00	BT	Paved	3.200	P	Paved	5.500	P	0.0	0.0	0.000	7.00	Junction (Back Side to Dudhnoi)
0.300	**0.400**	Plain	BU	BU	Dudhnoi	15.4	F	7.00	BT	Paved	4.000	P	Paved	4.400	P	0.0	0.0			
0.400	**0.500**	Plain	BU	BU	Dudhnoi	13.0	F	7.00	BT	Paved	3.000	P	Paved	3.000	P	0.0	0.0			
0.500	**0.600**	Plain	BU	BU	Dudhnoi	14.5	F	7.00	BT	Earthen	4.000	P	Earthen	3.500	P	0.0	0.0			
0.600	**0.700**	Plain	BU	BU	Dudhnoi	14.5	F	7.00	BT	Earthen	3.900	P	Earthen	3.600	P	0.0	0.0			
0.700	**0.800**	Plain	BU	BU	Dudhnoi	11.6	F	7.00	BT	Earthen	2.400	P	Earthen	2.200	P	0.0	0.0			
0.800	**0.900**	Plain	BU	BU	Dudhnoi	10.6	F	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	0.0	0.0			
0.900	**1.000**	Plain	BU	BU	Dudhnoi	10.8	F	7.00	BT	Earthen	1.9	P	Earthen	1.9	P	0.0	0.0			
1.000	**1.100**	Plain	BU	BU	Dudhnoi	10.6	F	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	0.0	0.0			
1.100	**1.200**	Plain	BU	BU	Dudhnoi	11.2	F	7.00	BT	Earthen	2.1	P	Earthen	2.1	P	0.0	0.0			
1.200	**1.300**	Plain	BU	BU	Dudhnoi	10.4	F	7.00	BT	Earthen	1.8	P	Earthen	1.6	P	0.0	0.0			

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Road Inventory Data Sheet

Appendix-I

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
1.300	1.400	Plain	BU	BU	Dudhnoi	10.3	F	7.00	BT	Earthen	2.1	P	Earthen	1.2	P	0.0	0.0			
1.400	1.500	Plain	BU	BU	Dudhnoi	9.9	F	7.00	BT	Earthen	1.6	P	Earthen	1.3	P	0.0	0.0			
1.500	1.600	Plain	BU	BU	Dudhnoi	10.2	F	7.00	BT	Earthen	1.800	P	Earthen	1.4	P	0.0	0.0			
1.600	1.700	Plain	BU	BU	Dudhnoi	9.6	F	7.00	BT	Earthen	1.300	P	Earthen	1.3	P	0.0	0.0			
1.700	1.800	Plain	BU	BU	Dudhnoi	9.9	F	7.00	BT	Earthen	1.500	P	Earthen	1.400	P	0.0	0.0			
1.800	1.900	Plain	BU	BU	Dudhnoi	9.7	F	7.00	BT	Earthen	1.2	P	Earthen	1.500	P	0.0	0.0			
1.900	2.000	Plain	BU	BU	Dudhnoi	10.1	F	7.00	BT	Earthen	1.3	P	Earthen	1.800	P	0.0	0.0			
2.000	2.100	Plain	BU	BU	Dudhnoi	10.1	F	7.00	BT	Earthen	1.4	P	Earthen	1.700	P	0.0	0.0			
2.100	2.200	Plain	BU	BU	Dudhnoi	9.9	F	7.00	BT	Earthen	1.3	P	Earthen	1.600	P	0.0	0.0			
2.200	2.300	Plain	BU	BU	Dudhnoi	9.5	F	7.00	BT	Earthen	1.6	P	Earthen	0.9	P	0.0	0.0			
2.300	2.400	Plain	BU	BU	Dudhnoi	10.7	F	7.00	BT	Earthen	1.8	P	Earthen	1.9	P	0.0	0.0			
2.400	2.500	Plain	BU	BU	Dudhnoi	10.7	F	7.00	BT	Earthen	1.9	P	Earthen	1.8	P	0.0	0.0			

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Appendix-I

Road Inventory Data Sheet

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
2.500	**2.600**	Plain	BU	BU	Dudhnoi	10.9	F	7.00	BT	Earthen	1.8	P	Earthen	2.1	P	0.0	0.0			
2.600	**2.700**	Plain	BU	BU	Dudhnoi	10.7	F	7.00	BT	Earthen	2.1	P	Earthen	1.6	P	0.0	0.0			
2.700	**2.800**	Plain	BU	BU	Dudhnoi	9.8	F	7.00	BT	Earthen	1.6	P	Earthen	1.2	P	0.0	0.0			
2.800	**2.900**	Plain	BU	BU	Dudhnoi	9.5	F	7.00	BT	Earthen	1.2	P	Earthen	1.3	P	0.0	0.0			
2.900	**3.000**	Plain	BU	BU	Dudhnoi	9.7	F	7.00	BT	Earthen	1.3	P	Earthen	1.4	P	0.0	0.0			
3.000	**3.100**	Plain	BU	BU	Dudhnoi	10.0	F	7.00	BT	Earthen	1.4	P	Earthen	1.600	P	0.0	0.0			
3.100	**3.200**	Plain	BU	BU	Damra	10.1	F	7.00	BT	Earthen	1.3	P	Earthen	1.8	P	0.20	0.30			
3.200	**3.300**	Plain	BU	BU	Damra	9.8	F	7.00	BT	Earthen	0.9	P	Earthen	1.9	P	0.20	1.30			
3.300	**3.400**	Plain	BU	BU	Damra	10.6	F	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	0.30	1.60			

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Road Inventory Data Sheet

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
3.400	**3.500**	Plain	BU	BU	Damra	11.0	F	7.00	BT	Earthen	1.9	P	Earthen	2.1	P	0.4	1.4			
3.500	**3.600**	Plain	BU	BU	Damra	10.4	F	7.00	BT	Earthen	1.8	P	Earthen	1.6	P	0.2	1.6			
3.600	**3.700**	Plain	BU	BU	Damra	10.3	F	7.00	BT	Earthen	2.1	P	Earthen	1.2	P	0.3	1.5			
3.700	**3.800**	Plain	BU	BU	Damra	9.9	F	7.00	BT	Earthen	1.6	P	Earthen	1.3	P	0.2	1.9			
3.800	**3.900**	Plain	BU	BU	Damra	9.6	F	7.00	BT	Earthen	1.2	P	Earthen	1.4	P	1.2	2.1			
3.900	**4.000**	Plain	BU	BU	Damra	10.0	F	7.00	BT	Earthen	1.3	P	Earthen	1.700	P	2.2	2.4			
4.000	**4.100**	Plain	BU	BU	Damra	10.5	F	7.00	BT	Earthen	1.4	P	Earthen	2.100	P	4.0	3.0			
4.100	**4.200**	Plain	BU	BU	Damra	10.7	F	7.00	BT	Earthen	1.9	P	Earthen	1.800	P	5.0	3.0			
4.200	**4.300**	Plain	BU	BU	Damra	10.1	F	7.00	BT	Earthen	1.4	P	Earthen	1.700	P	0.1	0.1			

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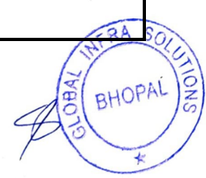
Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
4.300	**4.400**	Plain	BU	BU	Damra	10.3	F	7.00	BT	Paved	1.8	P	Earthen	1.500	P	0.0	0.0			
4.400	**4.500**	Plain	BU	BU	Damra	10.1	F	7.00	BT	Paved	1.9	P	Earthen	1.200	P	0.0	0.0			
4.500	**4.600**	Plain	BU	BU	Damra	8.8	F	7.00	BT	Earthen	1.8	P	Earthen		P	1.2	1.2			
4.600	**4.700**	Plain	BU	BU	Damra	10.9	F	7.00	BT	Earthen	2.1	P	Earthen	1.8	P	1.5	1.5			
4.700	**4.800**	Plain	BU	BU	Damra	10.5	F	7.00	BT	Earthen	1.6	P	Earthen	1.9	P	1.8	1.9			
4.800	**4.900**	Plain	BU	BU	Damra	10.0	F	7.00	BT	Earthen	1.2	P	Earthen	1.8	P	3.0	2.8			
4.900	**5.000**	Plain	BU	BU	Damra	10.4	F	7.00	BT	Earthen	1.3	P	Earthen	2.1	P	2.5	2.5			
5.000	**5.100**	Plain	BU	BU	Damra	10.0	F	7.00	BT	Earthen	1.4	P	Earthen	1.6	P	2.1	2.2			
5.100	**5.200**	Plain	BU	BU	Damra	9.5	F	7.00	BT	Earthen	1.3	P	Earthen	1.2	P	1.5	3.2			
5.200	**5.300**	Plain	BU	BU	Damra	9.2	F	7.00	BT	Earthen	0.9	P	Earthen	1.3	P	1.6	3.5			



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Road Inventory Data Sheet

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
5.300	**5.400**	Plain	BU	BU	Damra	9.6	F	7.00	BT	Earthen	1.2	P	Earthen	1.4	P	2.2	1.1			
5.400	**5.500**	Plain	BU	BU	Damra	10.3	F	7.00	BT	Paved	1.8	P	Paved	1.500	P	3.5	1.2			
5.500	**5.600**	Plain	BU	BU	Damra	9.9	F	7.00	BT	Paved	1.7	P	Paved	1.200	P	0.0	0.0			
5.600	**5.700**	Plain	BU	BU	Damra	9.9	F	7.00	BT	Earthen	1.5	P	Earthen	1.400	P	0.0	0.0			
5.700	**5.800**	Plain	BU	BU	Damra	10.8	F	7.00	BT	Earthen	1.9	P	Earthen	1.9	P	0.0	0.0			
5.800	**5.900**	Plain	BU	BU	Damra	10.6	F	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	0.0	0.0			
5.900	**6.000**	Plain	BU	AGL	Damra	11.2	F	7.00	BT	Earthen	2.1	P	Earthen	2.1	P	0.0	0.0			
6.000	**6.100**	Plain	BU	AGL	Damra	10.2	F	7.00	BT	Earthen	1.6	P	Earthen	1.6	P	0.0	0.0			
6.100	**6.200**	Plain	BU	AGL	Nisan Gram	9.4	P	7.00	BT	Earthen	1.2	P	Earthen	1.2	P	4.0	3.5			
6.200	**6.300**	Plain	BU	AGL	Nisan Gram	9.6	P	7.00	BT	Earthen	1.3	P	Earthen	1.3	P	4.0	3.5			

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Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Type Left	Width (m)	Condition (G/F/P/VP)	Type Right	Width (m)	Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
6.300	**6.400**	Plain	AGL	AGL	Nisan Gram	9.8	P	7.00	BT	Earthen	1.4	P	Earthen	1.4	P	4.0	3.5			
6.400	**6.500**	Plain	AGL	AGL	Nisan Gram	10.8	P	7.00	BT	Earthen	1.9	P	Earthen	1.9	P	4.0	3.5			
6.500	**6.600**	Plain	AGL	AGL	Nisan Gram	9.8	P	7.00	BT	Earthen	1.4	P	Earthen	1.4	P	4.0	3.5			
6.600	**6.700**	Plain	AGL	AGL	Nisan Gram	10.6	P	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	4.0	3.5			
6.700	**6.800**	Plain	AGL	AGL	Nisan Gram	10.8	P	7.00	BT	Earthen	1.9	P	Earthen	1.9	P	4.0	3.5			
6.800	**6.900**	Plain	AGL	AGL	Nisan Gram	10.6	P	7.00	BT	Earthen	1.8	P	Earthen	1.8	P	2.7	2.5			
6.900	**7.000**	Plain	AGL	AGL	Nisan Gram	11.2	P	7.00	BT	Earthen	2.1	P	Earthen	2.1	P	1.9	2.2			
7.000	**7.100**	Plain	AGL	AGL	Nisan Gram	10.2	P	7.00	BT	Earthen	1.6	P	Earthen	1.6	P	2.8	1.2			
7.100	**7.200**	Plain	AGL	AGL	Nisan Gram	9.4	P	7.00	BT	Earthen	1.2	P	Earthen	1.2	P	3.1	0.0			
7.200	**7.300**	Plain	AGL	AGL	Nakma Kundi	9.6	P	7.00	BT	Earthen	1.3	P	Earthen	1.3	P	3.2	0.2			

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-I

Road Inventory Data Sheet

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
7.300	**7.400**	Plain	AGL	AGL	Nakma Kundi	9.8	P	7.00	BT	Earthen	1.4	P	Earthen	1.4	P	3.1	0.1			
7.400	**7.500**	Plain	AGL	AGL	Nakma Kundi	9.6	P	7.00	BT	Earthen	1.3	P	Earthen	1.3	P	0.2	1.6			
7.500	**7.600**	Plain	AGL	AGL	Nakma Kundi	10.7	P	7.00	BT	Earthen	1.9	P	Earthen	1.8	P	0.3	1.5			
7.600	**7.700**	Plain	AGL	AGL	Nakma Kundi	10.9	P	7.00	BT	Earthen	1.8	P	Earthen	2.1	P	0.2	1.9			
7.700	**7.800**	Plain	AGL	AGL	Nakma Kundi	10.7	P	7.00	BT	Earthen	2.1	P	Earthen	1.6	P	1.9	2.2			
7.800	**7.900**	Plain	AGL	AGL	Nakma Kundi	9.8	P	7.00	BT	Earthen	1.6	P	Earthen	1.2	P	2.8	1.2			
7.900	**8.000**	Plain	AGL	AGL	Nakma Kundi	9.5	P	7.00	BT	Earthen	1.2	P	Earthen	1.3	P	3.1	0.0			
8.000	**8.100**	Plain	AGL	AGL	Nakma Kundi	9.7	P	7.00	BT	Earthen	1.3	P	Earthen	1.4	P	3.2	0.2			
8.100	**8.200**	Plain	BU	AGL	Nakma Kundi	10.3	P	7.00	BT	Earthen	1.4	P	Earthen	1.9	P	3.1	0.1			
8.200	**8.300**	Plain	BU	BU	Nakma Kundi	11.1	P	7.00	BT	Earthen	1.9	P	Earthen	2.200	P	3.2	1.1			

GLOBAL INFRA SOLUTIONS BHOPAL

Road Inventory Data Sheet

Appendix-I

Name of the Road : NH 62 New NH 217 **Road Classification-** Dudhnoi to Dinadubi

From: 0.000 **To** 8.415 **Date of Survey-** ……..

Chainage (Km.)		Terrain	Adjacent Landuse Pattern		Village / Town Name	Roadway Width (m)	Carriageway			Shoulder						Height of		Type of Cross Road		Remarks
From	To	Plain, Rolling, Hilly	Left	Right			Pavement Condition (G/F/P/VP)	Width (m) Avarage	Surface Type (BT/CC/GR/ER)	Left Type	Left Width (m)	Left Condition (G/F/P/VP)	Right Type	Right Width (m)	Right Condition (G/F/P/VP)	Embankment / Cutting (m) Left	Embankment / Cutting (m) Right	Location (Km)	Carriageway Width(m)	
8.300	8.400	Plain	BU	BU	Nakma Kundi	10.8	F	7.00	BT	Earthen	1.4	P	Earthen	2.400	P	3.1	1.2			
8.400	8.500	Plain	BU	BU	Nakma Kundi	10.9	F	7.00	BT	Earthen	1.8	P	Earthen	2.100	P	2.9	2.4			
8.500	8.600	Plain	BU	BU	Nakma Kundi	10.8	F	7.00	BT	Earthen	1.9	P	Earthen	1.900	P	3.2	2.1			

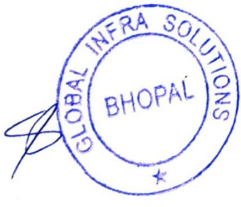
GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-II

Inventory & Condition Survey for Culverts

Road Name: Dudhnoi to Dainadubi Road (NH-217)

Sr. No.	Roadometer Chainage (km)	Existing Chainage (km)	Design Chainage (km)	Type of Culvert	Thk of Slab (m)	Span Arrangement		Length (m)	Carriage-way Width (m)	Overall Width (m)	Height above Bed Level (m)		Condition of various features of culvert						Details of Protection		Direction of Flow	Skew Angle (Deg.)	Bed Condition	Presence of Scour	Soil Type	Remarks
						No.	Span Length (m)				U/S	D/S	Sub Structure	Slab / Pipe / Box / Arch	Head walls	Wing walls	Return walls	ParaPet / Handrail	Type	Condition						
1	2	3	4	5	6	7		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1		0+800	0+800	RCC Slab Culvert	0.25	1	1.50	1.95	11.40	12.00	1.10	1.20	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-
2	2+345	2+320	2+320	RCC Slab Culvert	0.25	1	1.50	1.95	11.40	12.00	1.10	1.20	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-
3	3+380	3+385	3+385	RCC Slab Culvert	0.28	1	1.80	2.20	11.40	12.00	1.40	1.50	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Dry	-	-	-
4		5+500	5+515	RCC Slab Culvert	0.25	1	1.50	1.95	11.40	12.00	1.10	1.20	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-
5	5+900	5+900	5+915	RCC Slab Culvert	0.28	1	1.60	2.70	11.50	11.90	2.10	2.30	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-
6	6+310	6+300	6+305	RCC Slab Culvert	0.25	1	1.00	2.20	11.50	12.00	2.40	2.50	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Dry	-	-	-
7	6+450	6+440	6+445	RCC Slab Culvert	0.25	1	1.00	2.20	11.50	11.80	1.70	1.80	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Dry	-	-	-
8	7+100	7+100	7+110	RCC Slab Culvert	0.30	1	1.50	2.50	11.50	11.90	1.80	2.00	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-
9	8+370	8+355	8+340	RCC Slab Culvert	0.25	1	1.60	2.65	11.40	12.00	1.00	1.30	Poor	Fair	-	Poor	-	Poor	-	-	R-L	-	Dry	-	-	-
10	8+600	8+585	8+580	RCC Slab Culvert	0.35	1	4.00	5.00	7.50	8.60	2.50	2.70	Poor	Poor	-	Poor	-	Poor	-	-	R-L	-	Wet	-	-	-



Appendix-III

Inventory and Condition Survey for Bridges

Road Name: Dudhnoi to Dainadubi Road (NH-217)

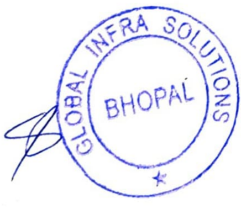
Sr. No.	Roadometer Chainage (km)	Existing Chainage (km Stone)	Design Chainage (km Stone)	Type of Bridge	Name of River	Year of Construction	Number of Spans	Span Length (C/C of Exp. Joint) (m)	Clear Span (m)	Overall Length of Bridge (i/c RW) (m)	High Level / Submissible	Carriageway Width of Bridge (m)	Overall Width of Bridge (m)	Width of Footpath (m)	Super Structure					Details of Wearing coat		Sub Structure								Foundation				Protection Work		Total Vertical Height (From top of deck Slab) (m)	Skew Angle (Degree)	Direction of Flow	High Flood level (HFL)	Present Condition of Bridge					Wet Dry	Soil Type	Remark
															Gradient	Type	Thickness of Slab / Girder (m)	Type of Bearing	Handrail / Parapet (Thk. & Ht.) (m)	Type	Thickness (mm)	Pier				Abutment				Pier Foundation		Abutment Foundation		Bed	Approach					Abutments	Piers	Slab	Bearings	Parapet			
																						Type	Thk. on Top (m)	Thk. on Bottom (m)	Height (m)	Type	Thk. on Top (m)	Thk. on Bottom (m)	Height (m)	Type	Material	Type	Material													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1	4+175	4+150	4+185	Minor Bridge	-	-	1	25.00	24.00	35.00	High level	7.50	8.40	-	-	T Beam	2.30	Elastomeric	0.300/ 1.200	BT	-	-	-	-	7.50	-	-	-	7.50	-	-	Open	RCC	-	-	11.20	-	R to L	-	Poor	-	Fair	Fair	Poor	Wet	Sandy	-
2	6+820	6+800	6+805	Minor Bridge	-	-	3	9.00	28.10	38.00	High level	7.50	8.00	-	-	RCC Slab	0.50	Tar Paper	0.300/ 1.200	BT	-	-	-	-	5.50	-	-	-	5.50	-	-	Open	PCC	-	-	5.80	-	R to L	-	Poor	Poor	Poor	Poor	-	Poor	Wet	-	-

GLOBAL INFRA SOLUTIONS BHOPAL

IMPROVEMENT PROPOSAL FOR STRUCTURES

Road Name: Dudhnoi to Dainadubi Road (NH-217)

Sr. No.	Location			Details of Existing Structure					Details of Proposed Structure						Remarks
	Roadometer Chainage	Existing Chainage	Design Chainage	Type of Structure	Span Arrangement (m)		Overall Width (m)	Condition of Structure	Recommeded Proposal for Structure	Type of Structure	Span Arrangement (m)		Overall Width (m)	Overall Length (m)	
1		0+800	0+800	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
2	2+345	2+345	2+345	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
3	3+380	3+380	3+385	RCC Slab Culvert	1	1.80	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
4	4+175	4+150	4+150	Minor Bridge	1	25.00	8.40	Poor	Retained + Newproposal	Minor Bridge	1	25.00	16.0	32.80	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction (with foothpath)
5	-	-	4+445	-	-	-	-	-	Newproposal	FOB (Steel)	1	15.00	16.0	37.00	
6		5+500	5+515	RCC Slab Culvert	1	1.50	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	
7	5+900	5+900	5+915	RCC Slab Culvert	1	1.60	11.90	Poor	Reconstruction	Box Culvert	1	6.0	12.0	13.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
8	6+310	6+295	6+305	RCC Slab Culvert	1	1.00	12.00	Poor	Reconstruction	Box Culvert	1	3.0	12.0	10.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
9	6+450	6+435	6+445	RCC Slab Culvert	1	1.00	11.80	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
10	6+820	6+800	6+805	Minor Bridge	3	9.00	8.00	Poor	Widening	Minor Bridge	3	9.00	8.0	39.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
11	7+100	7+090	7+110	RCC Slab Culvert	1	1.50	11.90	Poor	Reconstruction	Box Culvert	1	2.0	16.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction
12	8+370	8+355	8+410	RCC Slab Culvert	1	1.60	12.00	Poor	Reconstruction	Box Culvert	1	2.0	12.0	9.00	Due to Condition of existing structure is poor this Structure is recommeded to reconstruction



FLEXIBLE PAVEMENT DESIGN IRC:37-2018

Dudhnoi to Dainadubi Road

Estimation of effective subgrade modulus/CBR :-

Subgrade 90th percentile CBR = 5.375 %

Borrow Area CBR = 8.62 %

Elasic modulus of the prepared (upper 500 mm) embankment soil = $17.6 * (CBR)^{0.64}$ — Eq. 6.2 of IRC-37-2018

= 51.64 Mpa

Elasic modulus of the selected borrow area material = $17.6 * (CBR)^{0.64}$ — Eq. 6.2 of IRC-37-2018

= 69.86 Mpa

Consider the poisson's ratio value of both the layers to be = 0.35

Single load= 40000 N

Contact Pressure= 0.56 Mpa

Radius of circular contact area for this load and contact pressure = 150.8 mm

From input data, Surface deflection (From IITPAVE) = 2.256 mm (IITPAVE Results attached)

Foe an equivalent single layer system, the modulus value of thew single layer which will produce the same surface deflection of **2.256 mm** for the same load and for a poisson's ratio of 0.35

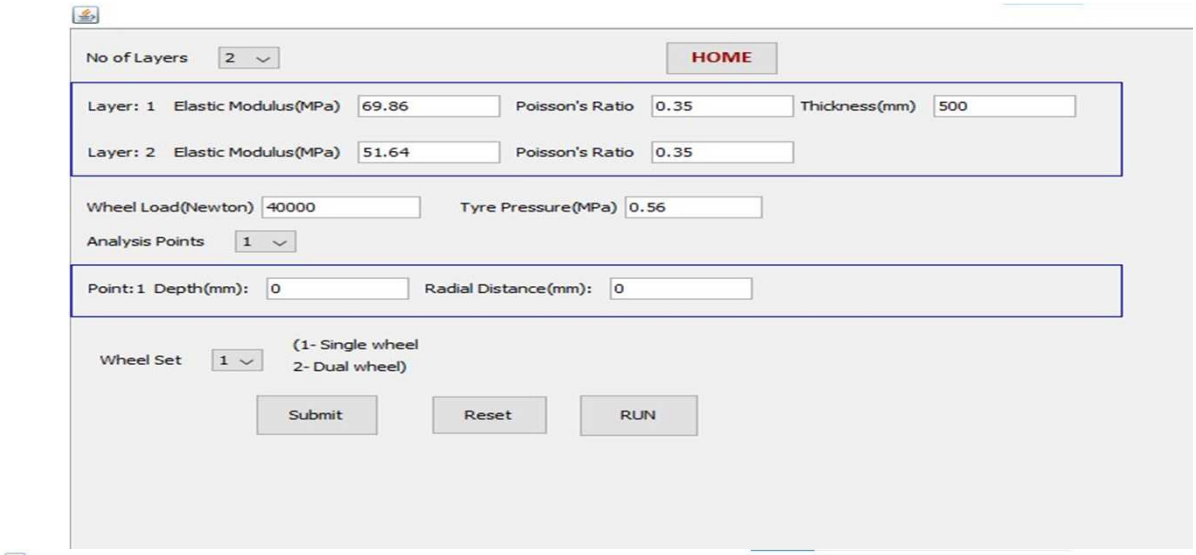
$$M_{RS} = \frac{2(1-\mu^2)pa}{\delta}$$ — Eq. 6.3 of IRC-37-2018

M_{RS}= 65.694 Mpa

Using eq. 6.2 The corresponding CBR= 7.83 %

The effective CBR is 7.83 % of the subgrade has been determined as per clause 6.4 of IRC 37-2018.

Further, **7% effective CBR** is adopted for the Pavement Design Purpose.



GLOBAL INFRA SOLUTIONS BHOPAL

FLEXIBLE PAVEMENT DESIGN IRC:37-2018

Dudhnoi to Dainadubi Road

Effective CBR =	7	%
Thickness of Granular layer =	150	mm
μ bituminous =	0.35	
μ granular =	0.35	
μctb/ctsb =	0.25	
Design MSA (Bituminous) =	20	
Design MSA (CT base / granular) =	20	
Reliability =	90	%

Assumed Thickness (mm)	
BC	30
DBM	50
WMM	150
CT sub base	200
	430

Resilient Modulus (M_{RS}) of Sub-grade :-

$M_{RS}=10.0*CBR$ For CBR upto 5%

$M_{RS}=17.6*(CBR)^{0.64}$ For CBR > 5%

As per IRC:37-2018 , Clause 6.3 of page no. 20

M_{RS}= 61.15 Mpa

E_{WMM}= 350.00 Mpa

Elastic modulus of cemented layer :

As per IRC:37-2018,Table 11.1, page no. 36

E_{CTSB}= 600 Mpa

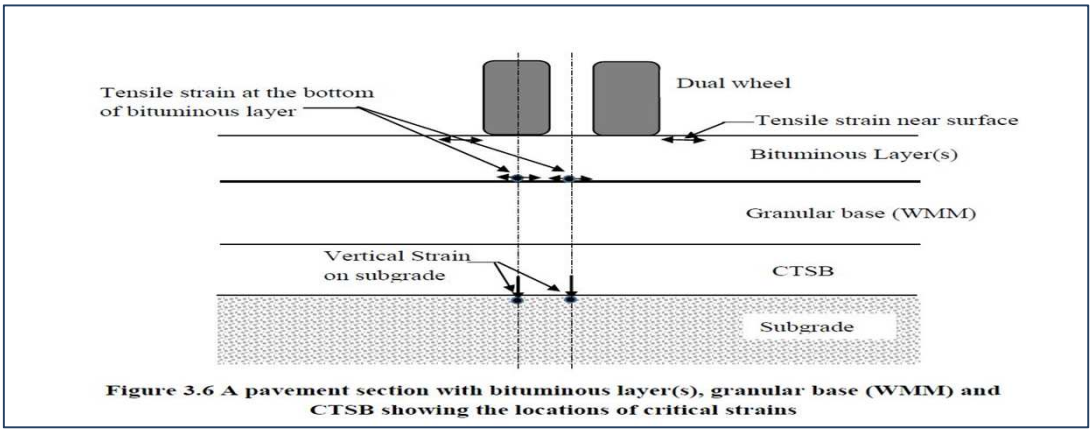


Figure 3.6 A pavement section with bituminous layer(s), granular base (WMM) and CTSB showing the locations of critical strains

Fatigue cracking criteria for bituminous layer i.e., Allowable tensile strain at the bottom of the bituminous layer :-

$N_f = 0.5161*C*10^{-04}[1/\varepsilon_t]^{3.89}*[1/M_{Rm}]^{0.854}$

Where, (for 90% reliabilty from equation 3.4, page no. 6 IRC:37-2018)

$C=10^M$, and $M=4.84*[V_{be}/(V_a+V_{be})-0.69]$

N_f= 20 Msa= 20x10^6

M_{Rm}= 3000

Volume of Bitumen V_{be} = 11.5 %

Volume of Airvoids V_a = 3.5 % (Clause 12.3, page no. 35 of IRC:37-2018)

M= 0.371066667

C= 2.349993531

ε_t= 0.0002028 (By IITPave)

$20*10^6 = 0.5161 \times 2.35 \times 10^{-4} \times (1/\varepsilon_t)^{3.89} \times (1/3000)^{0.854}$

$20*10^6 = 0.000121283 \times (1/\varepsilon t)^{3.89} \times 0.001072849$

$$(1/\varepsilon t)^{3.89} = \frac{20000000}{0.000121283 \times 0.001072849}$$

$(1/\varepsilon t)^{3.89}$ = 1.53706E+14

$(1/\varepsilon t)$ = 4435.721521

ε_t = 0.000225442

Hence the Pavement Composition on Bituminous Layer is SAFE

Subgrade Rutting criteria i.e.,
Allowable verticle compressive strain on the top of the Subgrade :-

$N_R=1.41x10^{-08}[1/\varepsilon_v]^{4.5337}$

(for 90% reliabilty from equation 3.2, page no. 5 IRC:37-2018)

N_R= 20 Msa = 20x10^6

$20x10^6=1.41X10^{-08}[1/\varepsilon_v]^{4.5337}$

$[1/\varepsilon v]^{4.5337}$ = 20000000 / 1.41E-08

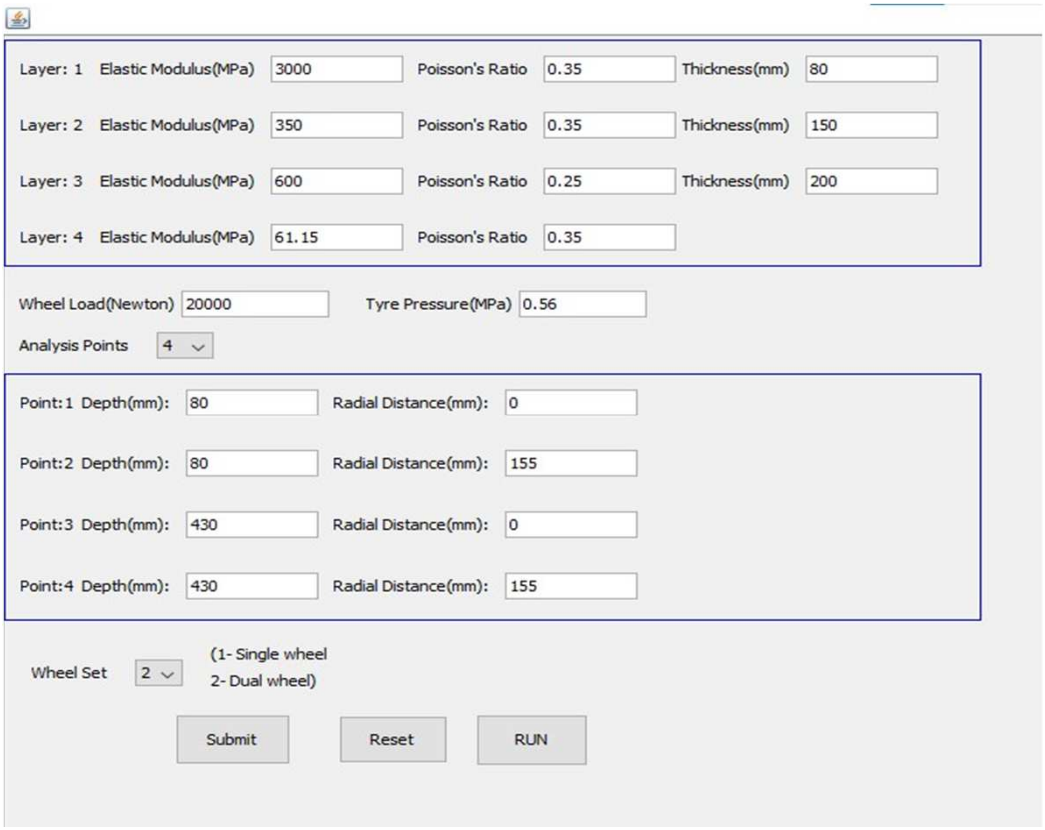
$[1/\varepsilon v]^{4.5337}$ = 1.41844E+15

$1/\varepsilon v$ = 2198.066929

ε_v= 0.000454945

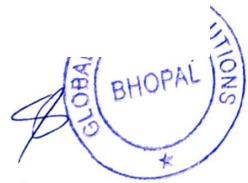
ε_v= 0.0004059 (By IITPave)

Hence the Pavement Composition on Subgrade is SAFE



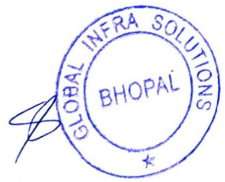

```
No. of layers                 4
E values (MPa)          3000.00  350.00  600.00   61.15
Mu values                  0.350.350.250.35
thicknesses (mm)          80.00  150.00  200.00
single wheel load (N) 20000.00
tyre pressure (MPa)        0.56
Dual  Wheel
   Z         R        SigmaZ       SigmaT      SigmaR      TaoRZ       DispZ       epZ         epT         epR
  80.00     0.00-0.2690E+00 0.7208E+00 0.5903E+00-0.1955E-01 0.4447E+00-0.2426E-03 0.2028E-03 0.1440E-03
  80.00L    0.00-0.2690E+00-0.4383E-01-0.5906E-01-0.1955E-01 0.4447E+00-0.6656E-03 0.2028E-03 0.1440E-03
  80.00   155.00-0.1655E+00 0.3802E+00-0.2517E+00-0.1125E+00 0.4399E+00-0.7017E-04 0.1754E-03-0.1089E-03
  80.00L 155.00-0.1655E+00-0.3438E-01-0.1081E+00-0.1125E+00 0.4399E+00-0.3305E-03 0.1754E-03-0.1089E-03
 430.00     0.00-0.2458E-01 0.1182E+00 0.9640E-01-0.4205E-02 0.3513E+00-0.1304E-03 0.1670E-03 0.1217E-03
 430.00L    0.00-0.2458E-01 0.1369E-02-0.6838E-03-0.4205E-02 0.3513E+00-0.4059E-03 0.1670E-03 0.1217E-03
 430.00   155.00-0.2665E-01 0.1281E+00 0.1098E+00-0.6785E-02 0.3625E+00-0.1435E-03 0.1788E-03 0.1407E-03
 430.00L 155.00-0.2666E-01 0.1538E-02-0.1875E-03-0.6789E-02 0.3625E+00-0.4437E-03 0.1788E-03 0.1407E-03
```

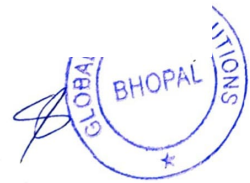
Two Laning with Paved Shoulders : Dudhnoi Road Section (NH-217)																	
FWD Survey Data (Analysis) Deflection Readings (PKG 1B)																	
Direction	LHS																
S.No.	Chainage (KM)	Load (KN)	Field Deflections(mm)							Asphalt Temperature(^{0}C)	Normalized Field Deflections(mm)						
			D_0	D_1	D_2	D_3	D_4	D_5	D_6		D_0	D_1	D_2	D_3	D_4	D_5	D_6
			0	200	300	450	600	900	1200		0	200	300	450	600	900	1200
1	0.000	42.6	0.29767	0.21367	0.18833	0.14100	0.11033	0.06800	0.04533	22.6	0.27928	0.20047	0.17670	0.13229	0.10352	0.06380	0.04253
2	0.510	39.9	0.81600	0.52067	0.45900	0.32367	0.23967	0.14700	0.09100	28.6	0.81873	0.52241	0.46054	0.32475	0.24047	0.14749	0.09130
3	0.990	40.5	0.59800	0.43600	0.34933	0.24167	0.17667	0.10833	0.06733	26.9	0.59110	0.43097	0.34530	0.23888	0.17463	0.10708	0.06656
4	1.610	39.5	0.79300	0.53833	0.46233	0.32600	0.23200	0.13333	0.08167	28.1	0.80372	0.54561	0.46858	0.33041	0.23514	0.13514	0.08277
5	1.980	39.6	0.74567	0.50767	0.37867	0.23967	0.14600	0.06300	0.03567	26.4	0.75257	0.51236	0.38217	0.24188	0.14735	0.06358	0.03600
6	2.480	39.3	0.82800	0.54500	0.47167	0.32767	0.21633	0.10833	0.05667	33.1	0.84275	0.55471	0.48007	0.33350	0.22019	0.11026	0.05768
7	3.020	40.2	0.49033	0.28200	0.19467	0.11200	0.07100	0.03833	0.02533	30.4	0.48830	0.28083	0.19386	0.11154	0.07071	0.03817	0.02523
8	3.560	40.5	0.58067	0.41967	0.34167	0.23633	0.14767	0.08200	0.04733	32.2	0.57303	0.41414	0.33717	0.23322	0.14572	0.08092	0.04671
9	4.100	39.4	0.74133	0.49233	0.39767	0.24833	0.16767	0.08900	0.05100	32.5	0.75262	0.49983	0.40372	0.25212	0.17022	0.09036	0.05178
10	4.540	39.7	0.66300	0.47067	0.33867	0.21000	0.13000	0.06167	0.03700	31.1	0.66745	0.47383	0.34094	0.21141	0.13087	0.06208	0.03725
11	5.020	38.9	0.81400	0.55067	0.39967	0.23867	0.14933	0.06967	0.04067	32.7	0.83774	0.56672	0.41132	0.24563	0.15369	0.07170	0.04185
12	5.570	37.8	0.92233	0.67133	0.50267	0.29400	0.18900	0.08533	0.04733	33.3	0.97688	0.71103	0.53239	0.31139	0.20018	0.09038	0.05013
13	6.060	38.4	0.76933	0.54900	0.42200	0.26600	0.18000	0.09400	0.05700	33.0	0.80209	0.57237	0.43997	0.27732	0.18766	0.09800	0.05943
14	6.580	39.5	0.61067	0.38633	0.26167	0.14833	0.07100	0.01967	0.00800	33.0	0.61788	0.39089	0.26476	0.15008	0.07184	0.01990	0.00809
15	7.030	39.3	0.64400	0.41400	0.28867	0.16033	0.10200	0.05100	0.02933	32.1	0.65547	0.42137	0.29381	0.16319	0.10382	0.05191	0.02986
16	7.540	39.8	0.57100	0.37733	0.27733	0.17400	0.11667	0.06900	0.04633	31.8	0.57339	0.37891	0.27849	0.17473	0.11715	0.06929	0.04653
17	8.020	41.7	0.38700	0.22400	0.18133	0.11133	0.06800	0.03100	0.01933	31.1	0.37122	0.21487	0.17394	0.10679	0.06523	0.02974	0.01855



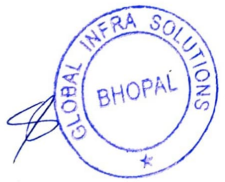
Dudhnoi Road Section (NH-217)																													
Back Calculated Layer Moduli & Correction for Temperature (LHS)																													
S.No.	Chainage (KM)	Load (KN)	Asphalt Temperature(^{0}C)	Normalized Field Deflections(mm)							Layer Thickness(mm)		Poisson's Ratio			Existing Condition (G/F/P)	BT Moduli Range(Mpa)		Granular Layers Moduli Range(Mpa)		Subgrade Moduli Range(Mpa)		Back Calculated Moduli(Mpa)			Corrected Moduli(Mpa)		
				D_0	D_1	D_2	D_3	D_4	D_5	D_6																			
				0	200	300	450	600	900	1200	BT	NBT	BT	NBT	Subgrade		Lower	Upper	Lower	Upper	Lower	Upper	BT	Granular	Subgrade	BT	Granular	Subgrade
1	0.000	40.0	22.6	0.27928	0.20047	0.17670	0.13229	0.10352	0.06380	0.04253	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1430	498.0	100.0	852.63	394.79	86.65
2	0.510	40.0	28.6	0.81873	0.52241	0.46054	0.32475	0.24047	0.14749	0.09130	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1462.4	486.7	99.9	1112.52	387.56	86.56
3	0.990	40.0	26.9	0.59110	0.43097	0.34530	0.23888	0.17463	0.10708	0.06656	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1484.9	494.9	100.0	1053.32	392.81	86.65
4	1.610	40.0	28.1	0.80372	0.54561	0.46858	0.33041	0.23514	0.13514	0.08277	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1490.3	498.8	99.9	1114.03	395.30	86.56
5	1.980	40.0	26.4	0.75257	0.51236	0.38217	0.24188	0.14735	0.06358	0.03600	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1484.9	258.7	100.0	1035.14	224.15	86.65
6	2.480	40.0	33.1	0.84275	0.55471	0.48007	0.33350	0.22019	0.11026	0.05768	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1444.1	496.1	100.0	1331.87	393.58	86.65
7	3.020	40.0	30.4	0.48830	0.28083	0.19386	0.11154	0.07071	0.03817	0.02523	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1476.3	476.9	100.0	1210.74	381.23	86.65
8	3.560	40.0	32.2	0.57303	0.41414	0.33717	0.23322	0.14572	0.08092	0.04671	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1329	492.2	100.0	1176.42	391.09	86.65
9	4.100	40.0	32.5	0.75262	0.49983	0.40372	0.25212	0.17022	0.09036	0.05178	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1272	497.7	100.0	1141.42	394.60	86.65
10	4.540	40.0	31.1	0.66745	0.47383	0.34094	0.21141	0.13087	0.06208	0.03725	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1462.4	439.4	100.0	1237.44	356.57	86.65
11	5.020	40.0	32.7	0.83774	0.56672	0.41132	0.24563	0.15369	0.07170	0.04185	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1467.7	347.1	100.0	1329.09	292.20	86.65
12	5.570	40.0	33.3	0.97688	0.71103	0.53239	0.31139	0.20018	0.09038	0.05013	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1492.5	322.1	100.0	1382.85	273.70	86.65
13	6.060	40.0	33.0	0.80209	0.57237	0.43997	0.27732	0.18766	0.09800	0.05943	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1488.2	476.5	100.0	1366.27	380.98	86.65
14	6.580	40.0	33.0	0.61788	0.39089	0.26476	0.15008	0.07184	0.01990	0.00809	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1359.1	100.4	99.9	1247.74	73.40	86.56
15	7.030	40.0	32.1	0.65547	0.42137	0.29381	0.16319	0.10382	0.05191	0.02986	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1495.7	351.4	100.0	1318.00	295.34	86.65
16	7.540	40.0	31.8	0.57339	0.37891	0.27849	0.17473	0.11715	0.06929	0.04653	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1443	496.9	100.0	1254.43	394.09	86.65
17	8.020	40.0	31.1	0.37122	0.21487	0.17394	0.10679	0.06523	0.02974	0.01855	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1475.3	384.3	100.0	1248.35	318.84	86.65

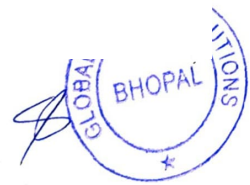
15th Percentile Value	=	1077	281	87





Two Laning with Paved Shoulders : Dudhnoi Road Section (NH-217)																
FWD Survey Data (Analysis) Deflection Readings (PKG 1B)																
Direction	RHS															
S.No.	Chainage (KM)	Load (KN)	Field Deflections(mm)							Asphalt Temperature(^{0}C)	Normalized Field Deflections(mm)						
			D_0	D_1	D_2	D_3	D_4	D_5	D_6		D_0	D_1	D_2	D_3	D_4	D_5	D_6
			0	200	300	450	600	900	1200		0	200	300	450	600	900	1200
1	0.012	41.3	0.28100	0.24100	0.18800	0.14200	0.10233	0.06267	0.04000	27.6	0.27215	0.23341	0.18208	0.13753	0.09911	0.06069	0.03874
2	0.530	41.1	0.54267	0.38600	0.33000	0.24767	0.18333	0.12000	0.08267	27.6	0.52814	0.37567	0.32117	0.24104	0.17843	0.11679	0.08045
3	1.007	40.4	0.50200	0.43033	0.35500	0.26333	0.18600	0.11133	0.07300	27.6	0.49703	0.42607	0.35149	0.26073	0.18416	0.11023	0.07228
4	1.630	39.6	0.80933	0.62767	0.52667	0.39767	0.28167	0.15533	0.08767	27.3	0.81820	0.63454	0.53243	0.40202	0.28475	0.15703	0.08863
5	1.995	40.9	0.49033	0.38167	0.29100	0.18267	0.11767	0.05933	0.04033	27.6	0.47915	0.37296	0.28436	0.17850	0.11498	0.05798	0.03941
6	2.510	40.5	0.50033	0.41300	0.34000	0.24033	0.16333	0.07900	0.04233	27.3	0.49375	0.40757	0.33553	0.23717	0.16118	0.07796	0.04178
7	3.035	41.2	0.36900	0.30700	0.23633	0.16333	0.10433	0.05967	0.04433	27.4	0.35854	0.29830	0.22964	0.15870	0.10138	0.05798	0.04308
8	3.581	41.2	0.40867	0.26133	0.22167	0.13967	0.09433	0.04767	0.02867	27.7	0.39676	0.25372	0.21521	0.13560	0.09159	0.04628	0.02783
9	4.121	40.9	0.43000	0.32067	0.23700	0.16133	0.09433	0.04267	0.02500	27.3	0.42088	0.31387	0.23197	0.15791	0.09233	0.04176	0.02447
10	4.556	40.1	0.57100	0.46233	0.36967	0.26400	0.16000	0.07100	0.03433	27.6	0.57005	0.46156	0.36905	0.26356	0.15973	0.07088	0.03428
11	5.034	41.0	0.45400	0.32767	0.24233	0.16033	0.09600	0.04933	0.03200	27.4	0.44293	0.31967	0.23642	0.15642	0.09366	0.04813	0.03122
12	5.589	40.2	0.58933	0.48267	0.36767	0.25333	0.17600	0.10533	0.06700	27.4	0.58640	0.48027	0.36584	0.25207	0.17512	0.10481	0.06667
13	6.080	40.5	0.42533	0.35433	0.29767	0.20167	0.14467	0.07500	0.04167	27.3	0.42043	0.35025	0.29423	0.19934	0.14300	0.07414	0.04119
14	6.590	40.6	0.50600	0.39800	0.31033	0.21733	0.13667	0.06767	0.03900	27.6	0.49811	0.39180	0.30550	0.21395	0.13454	0.06661	0.03839
15	7.044	39.0	0.81067	0.63833	0.49567	0.31133	0.18667	0.07500	0.04067	26.7	0.83216	0.65526	0.50881	0.31959	0.19162	0.07699	0.04175
16	7.555	39.6	0.58667	0.46333	0.37533	0.26733	0.18733	0.10700	0.06600	27.1	0.59259	0.46801	0.37912	0.27003	0.18923	0.10808	0.06667
17	8.032	40.2	0.63000	0.51100	0.40667	0.27133	0.17033	0.07300	0.04000	27.6	0.62687	0.50846	0.40464	0.26998	0.16949	0.07264	0.03980



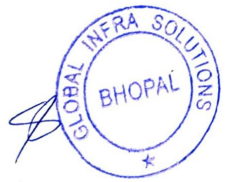


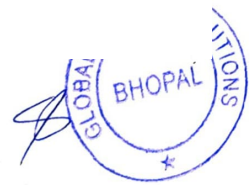
Dudhnoi Road Section (NH-217)

Back Calculated Layer Moduli & Correction for Temperature (RHS)

S.No.	Chainage (KM)	Load (KN)	Asphalt Temperature(^{0} C)	Normalized Field Deflections(mm)							Layer Thickness(mm)		Poisson's Ratio			Existing Condition (G/F/P)	BT Moduli Range(Mpa)		Granular Layers Moduli Range(Mpa)		Subgrade Moduli Range(Mpa)		Back Calculated Moduli(Mpa)			Corrected Moduli(Mpa)		
				D_0	D_1	D_2	D_3	D_4	D_5	D_6	BT	NBT	BT	NBT	Subgrade		Lower	Upper	Lower	Upper	Lower	Upper	BT	Granular	Subgrade	BT	Granular	Subgrade
				0	200	300	450	600	900	1200																		
1	0.012	40.0	27.6	0.27215	0.23341	0.18208	0.13753	0.09911	0.06069	0.03874	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1476.3	499.6	99.9	1079.73	395.81	86.56
2	0.530	40.0	27.6	0.52814	0.37567	0.32117	0.24104	0.17843	0.11679	0.08045	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1498.9	499.6	99.9	1096.26	395.81	86.56
3	1.007	40.0	27.6	0.49703	0.42607	0.35149	0.26073	0.18416	0.11023	0.07228	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1410.8	499.6	99.9	1031.83	395.81	86.56
4	1.630	40.0	27.3	0.81820	0.63454	0.53243	0.40202	0.28475	0.15703	0.08863	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1465.6	498.8	99.9	1058.42	395.30	86.56
5	1.995	40.0	27.6	0.47915	0.37296	0.28436	0.17850	0.11498	0.05798	0.03941	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1444.1	491.8	100.0	1056.18	390.83	86.65
6	2.510	40.0	27.3	0.49375	0.40757	0.33553	0.23717	0.16118	0.07796	0.04178	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1457.0	493.0	100.0	1052.21	391.60	86.65
7	3.035	40.0	27.4	0.35854	0.29830	0.22964	0.15870	0.10138	0.05798	0.04308	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1459.1	498.8	100.0	1058.18	395.30	86.65
8	3.581	40.0	27.7	0.39676	0.25372	0.21521	0.13560	0.09159	0.04628	0.02783	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1491.4	493.0	99.9	1095.39	391.60	86.56
9	4.121	40.0	27.3	0.42088	0.31387	0.23197	0.15791	0.09233	0.04176	0.02447	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1463.4	499.2	99.9	1056.83	395.56	86.56
10	4.556	40.0	27.6	0.57005	0.46156	0.36905	0.26356	0.15973	0.07088	0.03428	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1495.7	493.4	100.0	1093.92	391.86	86.65
11	5.034	40.0	27.4	0.44293	0.31967	0.23642	0.15642	0.09366	0.04813	0.03122	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1443.0	494.9	100.0	1046.51	392.81	86.65
12	5.589	40.0	27.4	0.58640	0.48027	0.36584	0.25207	0.17512	0.10481	0.06667	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1447.3	496.5	100.0	1049.63	393.84	86.65
13	6.080	40.0	27.3	0.42043	0.35025	0.29423	0.19934	0.14300	0.07414	0.04119	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1466.7	496.9	100.0	1059.22	394.09	86.65
14	6.590	40.0	27.6	0.49811	0.39180	0.30550	0.21395	0.13454	0.06661	0.03839	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1438.7	497.3	100.0	1052.23	394.35	86.65
15	7.044	40.0	26.7	0.83216	0.65526	0.50881	0.31959	0.19162	0.07699	0.04175	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1493.5	484.4	100.0	1051.66	386.08	86.65
16	7.555	40.0	27.1	0.59259	0.46801	0.37912	0.27003	0.18923	0.10808	0.06667	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1433.3	498.4	100.0	1026.41	395.05	86.65
17	8.032	40.0	27.6	0.62687	0.50846	0.40464	0.26998	0.16949	0.07264	0.03980	50	450	0.5	0.4	0.4	Good	750	2000	100	500	20	100	1465.6	498.4	100.0	1071.91	395.05	86.65

	15th Percentile Value	**=**	**1048**	**392**	**87**





Overlay Design Summary (10 Years)		
Existinf Pavement Composition Adopted for aanalysis		
BT	50mm	
Granular	400mm	
Strength of Different Layers (Minimum) from Backcalculation		
BT Existing	983	Mpa
Granular Existing	234	Mpa
Subgrade	87	Mpa
Thickness of Different Layers (Minimum) adopted		
BT Existing	50	mm
Granular Existing	400	mm
Stress Analysis Result		
Tensile Allowed	276	
Tensile Calculated	244	
Comp. Allowed	484	
Comp. Calculated	304	
Result	Safe	
Overlay Details		
Thickness of BT (BC + DBM)	**80**	**mm**

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No. of layers 4
E values (MPa) 3000.00 1077.00 281.00 87.00
Mu values 0.500.400.400.40
thicknesses (mm) 80.00 50.00 400.00
single wheel load (N) 20000.00
tyre pressure (MPa) 0.56
Dual Wheel

Z	R	SigmaZ	SigmaT	SigmaR	TaoRZ	DispZ	epZ	epT	epR
130.00	0.00	-0.1575E+00	0.2878E+00	0.2201E+00	-0.2038E-01	0.3543E+00	-0.3349E-03	0.2439E-03	0.1560E-03
130.00L	0.00	-0.1575E+00	-0.2545E-02	-0.2019E-01	-0.2038E-01	0.3543E+00	-0.5283E-03	0.2439E-03	0.1560E-03
130.00	155.00	-0.1302E+00	0.2334E+00	0.6281E-01	-0.8052E-01	0.3627E+00	-0.2309E-03	0.2417E-03	0.2000E-04
130.00L	155.00	-0.1302E+00	-0.3267E-02	-0.4777E-01	-0.8052E-01	0.3627E+00	-0.3907E-03	0.2417E-03	0.2000E-04
530.00	0.00	-0.2410E-01	0.3984E-01	0.3434E-01	-0.4053E-02	0.2488E+00	-0.1914E-03	0.1272E-03	0.9980E-04
530.00L	0.00	-0.2407E-01	0.1246E-02	-0.4726E-03	-0.4053E-02	0.2488E+00	-0.2803E-03	0.1272E-03	0.9952E-04
530.00	155.00	-0.2595E-01	0.4294E-01	0.3913E-01	-0.5745E-02	0.2563E+00	-0.2092E-03	0.1340E-03	0.1151E-03
530.00L	155.00	-0.2595E-01	0.1362E-02	0.1576E-03	-0.5677E-02	0.2563E+00	-0.3053E-03	0.1343E-03	0.1149E-03

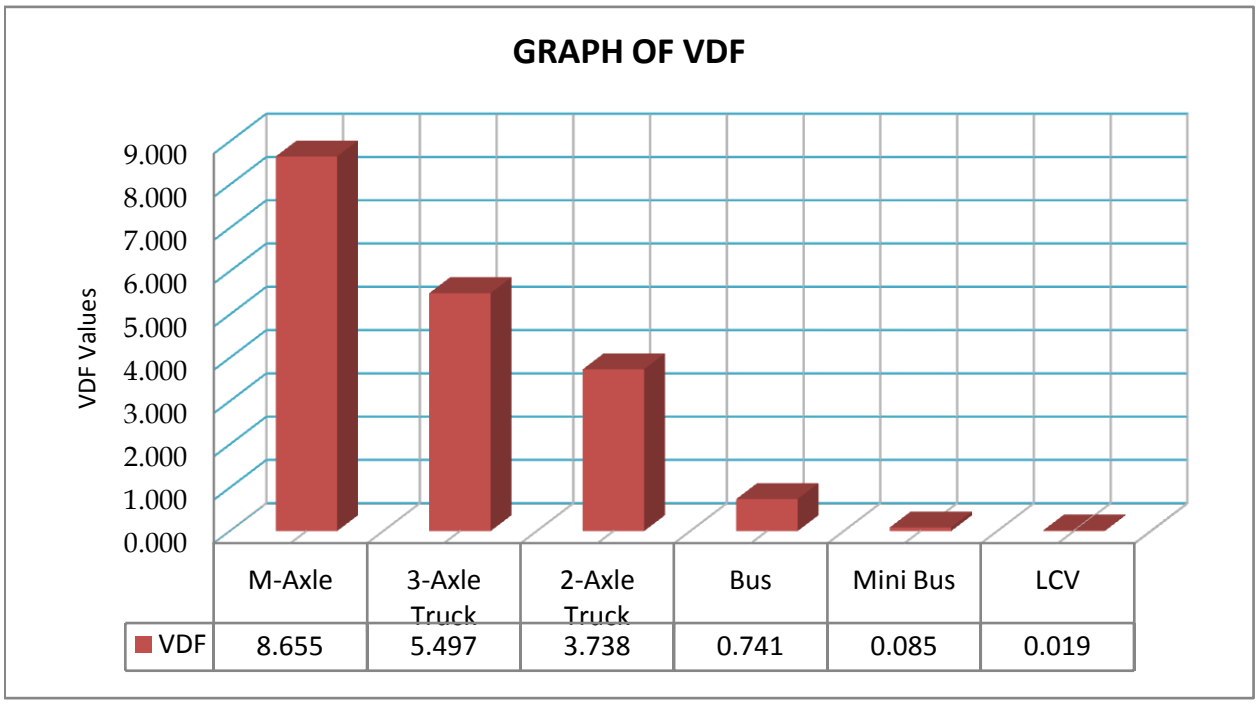
Appendix-VI

AXLE LOAD ANALYSIS

Road : Dudhoni - Damra (5 km) **Date-** Friday, November 23, 2018

Location : At km 3+500 (Near Damra A.S.A. Playground)

TYPE OF VEHICLES	VDF		
	UP	DOWN	MAX
M-Axle	8.655	4.084	**8.655**
3-Axle Truck	5.497	3.706	**5.497**
2-Axle Truck	2.619	3.738	**3.738**
Bus	0.334	0.741	**0.741**
Mini Bus	0.021	0.085	**0.085**
LCV	0.012	0.019	**0.019**



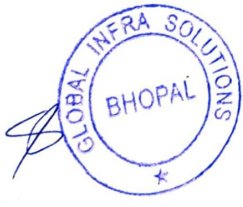
GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

AXLE-LOAD SURVEY (UP Direction)

Road : Dudhoni - Damra (5 km)
Section: Section-1
Location : At km 3+500 (Near Damra A.S.A. Playground)
Date : Friday, November 23, 2018
Direction : Dudhoni - Damra
Weather : Normal

Sl No	Vehicle Type	Origin	Destination	Commodity	Axle Load (Tonnes)				Remark
					Front	Rear1	Rear2	Rear3	
1	2	4	5	6	7	8	9	10	12
1	2-Axle	Dudhnoi	Damra	Empty	4.10	3.76			
2	LCV	Abhayapuri	Resubelpara	Animal Food	1.35	1.63			
3	LCV	Barpeta	Damra	Gas Cylender	1.37	1.71			
4	Mini Bus	Dudhnoi	Meghalaya	Passenger	1.63	2.49			
5	LCV	Guwahati	Songsak	Cement	1.69	2.09			
6	2-Axle	Dudhnoi	Damra	Gas Cylender	6.52	11.43			
7	LCV	Dudhnoi	Rongjeng	Transformer	1.37	1.79			
8	LCV	Paltan Bazaar	Shillong	Gas Cylender	1.43	2.07			
9	M-Axle	Bongaigaon	Rongjeng	Kabada	6.84	5.81	13.40	11.65	
10	Mini Bus	Kamakhya Mandir	Damra	Passenger	1.85	2.88			
11	2-Axle	Guwahati	Damra	Empty	3.80	3.34			
12	Bus	Hulukanda Hill	Shallang	Passenger	4.83	5.69			
13	LCV	Goalpara	Silchar	Empty	1.07	0.89			
14	LCV	Dudhnoi	Damra	Fruits	1.77	2.39			
15	LCV	Dudhnoi College	Tengasot Govt. Higher Sec. School	Furniture	1.45	1.79			
16	2-Axle	Abhayapuri	Hailakandi	Gas Cylender	6.48	11.01			
17	LCV	Dudhnoi	Mizoram	Sugar	1.85	2.17			
18	Mini Bus	Kamakhya Mandir	Damra	Passenger	1.99	2.90			
19	Bus	Mornoi	Songsak	Passenger	3.96	4.71			
20	LCV	Dudhnoi	Damra	Cement	1.57	2.09			
21	LCV	Paltan Bazaar	Market Damra	Khad	1.27	1.63			
22	2-Axle	Nalbari	Resubelpara	Oil Tanker	4.79	9.15			
23	Mini Bus	Manas National Park	Nongstoin	Passenger	1.57	2.43			
24	LCV	Jogighopa	Wageasi	Furniture	1.83	2.56			
25	M-Axle	Dudhnoi	Market Damra	Petrol	6.42	5.65	10.91	10.42	
26	Bus	Guwahati	Adugiri	Passenger	3.72	4.65			
27	LCV	Guwahati	Damra	Machine	1.61	2.07			
28	LCV	Guwahati	Rangram	Kabada	1.85	2.29			
29	2-Axle	Paltan Bazaar	Silchar	Oil Tanker	5.65	11.03			
30	LCV	Guwahati	Williamnagar	Sand	1.55	1.89			
31	LCV	Guwahati	Rangram	Empty	0.89	0.76			
32	LCV	Abhayapuri	Damra	Gas Cylinder	1.25	1.57			
33	2-Axle	Guwahati	Ranikor	Empty	3.64	3.30			
34	LCV	Bongaigaon	Silchar	Parcel	1.43	2.07			



Appendix-VI

AXLE-LOAD SURVEY (UP Direction)

Road : Dudhoni - Damra (5 km)
Section: Section-1
Location : At km 3+500 (Near Damra A.S.A. Playground)
Date : Friday, November 23, 2018
Direction : Dudhoni - Damra
Weather : Normal

Sl No	Vehicle Type	Origin	Destination	Commodity	Axle Load (Tonnes)				Remark
					Front	Rear1	Rear2	Rear3	
1	2	4	5	6	7	8	9	10	12
35	LCV	Dudhnoi College	Tengasot Govt. Higher Sec. School	Furniture	1.93	2.56			
36	LCV	Goalpara	Market Damra	Empty	0.93	0.74			
37	M-Axle	Barpeta	Shillong	Bricks	6.18	4.79	11.37	9.74	
38	Bus	Alipurduar	Shillong	Passenger	4.41	5.29			
39	LCV	Guwahati	Rongjeng	Bamboo	1.85	2.56			
40	Mini Bus	Guwahati	Meghalaya	Passenger	1.79	2.82			
41	2-Axle	Jogighopa	Damra	Furniture	4.99	10.60			
42	LCV	Jogighopa	Shillong	Empty	0.72	0.54			
43	LCV	Paltan Bazaar	Hailakandi	Empty	1.01	0.82			
44	LCV	Barpeta	Market Damra	Paper Roll	1.43	1.97			
45	2-Axle	Dudhnoi	Mizoram	Groceries	4.71	10.08			
46	LCV	Nalbari	Shallang	Mixture Machine	1.85	2.80			
47	LCV	Bongaigaon	Shallang	Wood	1.43	2.09			
48	2-Axle	Paltan Bazaar	Wageasi	Petrol Tanker	4.91	9.84			
49	M-Axle	Guwahati	Kolkata	Iron	6.50	4.57	12.31	10.95	
50	2-Axle	Barpeta	Shallang	Bricks	4.79	9.88			
51	2-Axle	Jogighopa	Shillong	Fruits	6.30	12.09			
52	Mini Bus	Agia	Shallang	Passenger	2.05	3.28			
53	M-Axle	Nalbari	Mizoram	Oil Tank	6.44	5.09	11.75	9.70	
54	3-Axle	Guwahati	Damra	Wheat	6.14	11.21	9.09		
55	3-Axle	Guwahati	Sahibganj	Petrol	6.58	13.48	11.15		
56	3-Axle	Nalbari	Silchar	Iron	6.26	11.33	9.50		

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Appendix-VI

AXLE-LOAD SURVEY (Down Direction)

Road : Dudhoni - Damra (5 km) **Section:** Section-1

Location : At km 3+500 (Near Damra A.S.A. Playground) **Date :** 11/23/2018

Direction : Damra-Dudhoni **Weather :** Normal

Sl No	Vehicle Type	Origin	Destination	Commodity	Axle Load (Tonnes)				Remark
					Front	Rear 1	Rear 2	Rear 3	
1	2	4	5	6	7	8	9		11
1	2-Axle	Churaibari	Guwahati	Auto Parts	5.76	10.18			
2	LCV	Damra Market	Dhupdhara	Chicken	1.47	2.13			
3	Bus	Shallang	Dudhnoi	Passenger	5.09	6.44			
4	3-Axle	Damra	Guwahati	Cement Pole	5.70	11.71	9.08		
5	LCV	Shallang	Bongaigaon	Fertilizer Bags	1.19	1.83			
6	2-Axle	Damra	Dudhnoi	Empty	3.58	3.14			
7	Mini Bus	Shillong	Goalpara	Passenger	1.73	2.70			
8	LCV	Rongram	Dhubri	Branch	1.79	2.60			
9	Bus	Dainadubi	Agia	Passenger	4.67	6.94			
10	3-Axle	Chokpot	Bongaigaon	Plastic Bags	4.81	11.39	8.45		
11	LCV	Shillong	Gohpur	Paddy	1.83	2.64			
12	2-Axle	Damra	Dudhnoi	Bricks	5.05	10.93			
13	LCV	Williamnagar	Dari Duri	Rice	1.21	1.93			
14	Bus	Shallang	Dudhnoi	Passenger	4.89	7.55			
15	Mini Bus	Wageasi Market	Abhayapuri	Passenger	1.99	3.20			
16	LCV	Damra	Dudhoni	Cloths Bundell	1.21	1.79			
17	LCV	Agartala	Dhupdhara	Cement	1.79	2.54			
18	2-Axle	Damra	Dudhnoi	Cement	6.30	12.86			
19	LCV	Damra	Goalpara	Fertilizer Bags	1.83	2.66			
20	Bus	Dainadubi	Dudhnoi	Passenger	4.25	5.82			
21	LCV	Churaibari	Guwahati	Machine	1.45	1.99			
22	Mini Bus	Shallang	Chapar	Passenger	3.54	4.67			
23	LCV	Tura	Agia	Chair	1.80	2.52			
24	2-Axle	Rongram	Darjeeling	Bricks	5.59	11.47			
25	LCV	Mizoram	Nalbari	Empty	0.87	0.78			
26	LCV	Shillong	Dudhnoi	Kabada	1.79	2.37			
27	LCV	Rompa	Bongaigaon	Chemical Tanke	1.87	2.64			
28	Mini Bus	Shillong	Krishnai	Passenger	3.86	5.74			
29	M-Axle	Tripura	Dhubri	Empty	4.51	3.60	3.34	2.80	
30	2-Axle	Shillong	Guwahati	Iron Rod	5.41	11.45			
31	LCV	Silchar	Dhupdhara	Plastic Pipe	1.81	2.87			
32	LCV	Shillong	Dudhnoi	Parcel	1.37	1.95			
33	2-Axle	Nairang	Goalpara	Gitti	4.79	10.87			
34	Mini Bus	Dainadubi	Dudhnoi	Passenger	2.46	3.10			
35	LCV	Churaibari	Guwahati	Groceries	1.79	2.58			
36	2-Axle	Siju	Boko	Iron	5.82	11.89			
37	LCV	Silchar	Barpeta	Gitti	1.55	2.27			
38	2-Axle	Shillong	Dhubri	Kabada	5.21	11.17			

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Appendix-VI

AXLE-LOAD SURVEY (Down Direction)

Road : Dudhoni - Damra (5 km) **Section:** Section-1

Location : At km 3+500 (Near Damra A.S.A. Playground) **Date :** 11/23/2018

Direction : Damra-Dudhoni **Weather :** Normal

Sl No	Vehicle Type	Origin	Destination	Commodity	Axle Load (Tonnes)				Remark
					Front	Rear 1	Rear 2	Rear 3	
1	2	4	5	6	7	8	9		11
39	LCV	Williamnagar	Agia	Empty	0.58	0.54			
40	Mini Bus	Shillong	Krishnai	Passenger	1.85	2.88			
41	2-Axle	Tura	Gohpur	Iron Pole	5.11	9.92			
42	LCV	Mizoram	Goalpara	Cement	1.87	2.42			
43	M-Axle	Agartala	Guwahati	Medicine	5.76	3.40	11.85	10.57	
44	2-Axle	Agartala	Goalpara	Sand	5.57	10.93			
45	LCV	Rongram	Dhubri	Empty	0.97	0.83			
46	Mini Bus	Williamnagar	Mornoi	Passenger	2.05	3.28			
47	2-Axle	Rompa	Guwahati	Cartoon Box	5.78	11.53			
48	LCV	Damra Market	Krishnai	Cement	1.39	3.36			
49	2-Axle	Tripura	Bongaigaon	Medicine	5.28	10.63			
50	LCV	Chokpot	Bongaigaon	Wood	1.37	2.13			
51	2-Axle	Mizoram	Dari Duri	Empty	4.21	3.84			
52	Mini Bus	Siju	Goalpara	Passenger	1.99	2.90			
53	LCV	Shillong	Barpeta	Gas Cylinder	1.47	2.13			
54	2-Axle	Rongram	Goalpara	Plywood	5.28	11.29			
55	LCV	Nairang	Agia	Sand	1.01	1.67			
56	2-Axle	Tripura	Dhubri	Paper Roll	4.77	11.93			
57	LCV	Tura	Goalpara	Water Tank	1.45	2.27			
58	Mini Bus	Williamnagar	Dhupdhara	Passenger	2.88	2.48			
59	2-Axle	Siju	Nalbari	Chemical Tanke	4.97	11.67			
60	LCV	Chokpot	Nalbari	Caret Box	1.27	1.61			
61	2-Axle	Agartala	Guwahati	Parcel	5.11	11.23			
62	2-Axle	Silchar	Goalpara	Groceries	4.67	11.70			

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Appendix-VI

VDF Calculations (M-Axle)

Sl No	M-Axle Truck (UP)																	
	Vehicle Type	Type of Commodity	Wheel Load (Tonne) Axle				Total Weight (Tonne)	Wheel Load (kN)				Total Weight (kN)	Equivalency Factor Axle				VDF	Average VDF
			Front	Rear-1	Rear-2	Rear-3		Front	Rear-1	Rear-2	Rear-3		Front	Rear-1	Rear-2	Rear-3		
2	M-Axle	Kabada	6.84	5.81	13.40	11.65	38.00	67.09	57.02	131.41	114.25	369.77	1.13	0.26	7.28	4.16	12.83	8.655
3	M-Axle	Petrol	6.42	5.65	10.91	10.42	33.00	62.94	55.45	106.95	102.21	327.55	0.88	0.23	3.19	2.66	6.97	
4	M-Axle	Bricks	6.18	4.79	11.37	9.74	32.00	60.58	46.96	111.48	95.50	314.52	0.75	0.12	3.77	2.03	6.68	
5	M-Axle	Iron	6.50	4.57	12.31	10.95	34.00	63.73	44.79	120.76	107.34	336.62	0.92	0.10	5.19	3.24	9.46	
6	M-Axle	Oil Tank	6.44	5.09	11.75	9.70	33.00	63.14	49.92	115.23	95.11	323.40	0.89	0.15	4.30	2.00	7.34	

Sl No	M- Axle Truck (DN)																	
	Vehicle Type	Type of Commodity	Wheel Load (Tonne) Axle				Total Weight (Tonne)	Wheel Load (kN)				Total Weight (kN)	Equivalency Factor Axle				VDF	Average VDF
			Front	Rear-1	Rear-2	Rear-3		Front	Rear-1	Rear-2	Rear-3		Front	Rear-1	Rear-2	Rear-3		
1	M-Axle	Empty	4.51	3.60	3.34	2.80	14.00	44.21	35.33	32.76	27.43	139.74	0.21	0.04	0.03	0.01	0.29	4.084
2	M-Axle	Medicine	5.76	3.40	11.85	10.57	32.00	56.53	33.35	116.25	103.62	309.75	0.57	0.03	4.46	2.81	7.87	

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Appendix-VI

VDF Calculations (3-Axle)

Sl No	3-Axle Truck (UP)													
	Vehicle Type	Type of Commodity	Wheel Load (Tonne)			Total Weight (Tonne)	Wheel Load (kN)			Total Weight (kN)	Equivalency Factor		Total VDF	Avg. VDF
			Axle								Axle			
			Front	Rear-1	Rear-2		Front	Rear-1	Rear-2		Front	Rear-1 & 2		
1	3-Axle	Wheat	6.14	11.21	9.09	26.00	60.18	109.91	89.19	259.27	0.735	3.275	4.010	5.497
2	3-Axle	Petrol	6.58	13.48	11.15	31.00	64.52	132.20	109.31	306.04	0.971	7.091	8.062	
3	3-Axle	Iron	6.26	11.33	9.50	27.00	61.37	111.09	93.13	265.59	0.794	3.626	4.420	

Sl No	3-Axle Truck (DN)													
	Vehicle Type	Type of Commodity	Wheel Load (Tonne)			Total Weight (Tonne)	Wheel Load (kN)			Total Weight (kN)	Equivalency Factor		Total VDF	Avg. VDF
			Axle								Axle			
			Front	Rear-1	Rear-2		Front	Rear-1	Rear-2		Front	Rear-1 & 2		
1	3-Axle	Cement	5.70	11.71	9.08	26.00	55.85	114.87	89.01	259.73	0.545	3.601	4.146	3.706
2	3-Axle	Plastic Bags	4.81	11.39	8.45	25.00	47.17	111.71	82.89	241.77	0.277	2.989	3.267	

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Appendix-VI

VDF Calculations (2-Axle)

Sl No	2-Axle Truck (UP)											
	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	2-Axle	Empty	4.1045	3.7624	8.00	40.25	36.90	77.15	0.147	0.045	0.192	2.619
2	2-Axle	Gas Cylender	6.5189	11.428	18.00	63.93	112.08	176.01	0.936	3.852	4.788	
3	2-Axle	Empty	3.8027	3.3399	7.00	37.29	32.75	70.05	0.108	0.028	0.136	
4	2-Axle	Gas Cylender	6.4786	11.006	17.00	63.54	107.93	171.47	0.913	3.313	4.226	
5	2-Axle	Oil Tanker	4.7886	9.1546	14.00	46.96	89.78	136.74	0.272	1.586	1.859	
6	2-Axle	Oil Tanker	5.6537	11.026	17.00	55.45	108.13	163.58	0.529	3.337	3.867	
7	2-Axle	Empty	3.6417	3.2997	7.00	35.71	32.36	68.07	0.091	0.027	0.118	
8	2-Axle	Furniture	4.9898	10.603	16.00	48.93	103.99	152.92	0.321	2.855	3.176	
9	2-Axle	Groceries	4.7081	10.08	15.00	46.17	98.86	145.03	0.255	2.332	2.586	
10	2-Axle	Petrol Tanker	4.9093	9.8387	15.00	48.15	96.49	144.63	0.301	2.116	2.417	
11	2-Axle	Bricks	4.7886	9.8789	15.00	46.96	96.88	143.84	0.272	2.151	2.423	
12	2-Axle	Fruits	6.2976	12.092	18.00	61.76	118.59	180.35	0.815	4.828	5.643	

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Sl No	2-Axle Truck (DN)											
	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	2-Axle	Auto Parts	5.76	10.18	16.00	56.45	99.87	156.31	0.569	2.428	2.997	3.738
2	2-Axle	Empty	3.58	3.14	7.00	35.13	30.79	65.92	0.085	0.022	0.107	
3	2-Axle	Bricks	5.05	10.93	16.00	49.54	107.17	156.71	0.337	3.221	3.558	
4	2-Axle	Cement	6.30	12.86	19.00	61.78	126.12	187.89	0.816	6.176	6.992	
5	2-Axle	Bricks	5.59	11.47	17.00	54.87	112.50	167.37	0.508	3.910	4.418	
6	2-Axle	Iron Rod	5.41	11.45	17.00	53.09	112.30	165.39	0.445	3.883	4.328	
7	2-Axle	Gitti	4.79	10.87	16.00	46.97	106.58	153.55	0.273	3.150	3.423	
8	2-Axle	Iron	5.8161	11.894	18.00	57.04	116.64	173.68	0.593	4.519	5.112	
9	2-Axle	Kabada	5.2124	11.169	16.00	51.12	109.54	160.66	0.383	3.515	3.897	
10	2-Axle	Iron Pole	5.1118	9.9216	15.00	50.13	97.30	147.43	0.354	2.188	2.542	
11	2-Axle	Sand	5.5746	10.928	17.00	54.67	107.17	161.84	0.500	3.221	3.721	
12	2-Axle	Cartoon Box	5.7759	11.532	17.00	56.64	113.09	169.73	0.577	3.993	4.570	
13	2-Axle	Medicine	5.28	10.63	16.00	51.83	104.25	156.08	0.404	2.884	3.288	
14	2-Axle	Empty	4.21	3.84	8.00	41.25	37.70	78.95	0.162	0.049	0.211	
15	2-Axle	Plywood	5.28	11.29	17.00	51.79	110.68	162.47	0.403	3.664	4.067	
16	2-Axle	Paper Roll	4.77	11.93	17.00	46.78	117.02	163.79	0.268	4.578	4.846	
17	2-Axle	Chemical Tanker	4.97	11.67	17.00	48.75	114.45	163.20	0.316	4.189	4.506	
18	2-Axle	Parcel	5.11	11.23	16.00	50.13	110.15	160.28	0.354	3.594	3.948	
19	2-Axle	Groceries	4.67	11.70	16.00	45.81	114.79	160.60	0.247	4.239	4.485	

VDF Calculations (Bus)

Bus (UP)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	Bus	Passenger	4.83	5.69	10.52	47.36	55.84	103.20	0.282	0.237	0.519	0.334
2	Bus	Passenger	3.96	4.71	8.67	38.87	46.17	85.04	0.128	0.111	0.239	
3	Bus	Passenger	3.72	4.65	8.37	36.50	45.58	82.08	0.099	0.105	0.205	
4	Bus	Passenger	4.41	5.29	9.70	43.21	51.89	95.11	0.195	0.177	0.372	

Bus (DN)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	Bus	Passenger	5.09	6.44	11.53	49.93	63.16	113.09	0.348	0.388	0.737	0.741
2	Bus	Passenger	4.67	6.94	11.61	45.79	68.09	113.88	0.246	0.525	0.771	
3	Bus	Passenger	4.89	7.55	12.44	47.96	74.01	121.97	0.296	0.733	1.029	
4	Bus	Passenger	4.25	5.82	10.06	41.64	57.04	98.68	0.168	0.258	0.427	

Appendix-VI

VDF Calculations (Mini Bus)

Bus (UP)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	Mini Bus	Passenger	1.6297	2.4949	4.12	15.98	24.47	40.45	0.004	0.009	0.012	0.021
2	Mini Bus	Passenger	1.85	2.88	4.73	18.15	28.22	46.37	0.006	0.015	0.022	
3	Mini Bus	Passenger	1.99	2.90	4.89	19.53	28.41	47.95	0.008	0.016	0.024	
4	Mini Bus	Passenger	1.57	2.43	4.00	15.39	23.88	39.27	0.003	0.008	0.011	
5	Mini Bus	Passenger	1.79	2.82	4.61	17.56	27.62	45.19	0.005	0.014	0.020	
6	Mini Bus	Passenger	2.05	3.28	5.33	20.13	32.16	52.29	0.009	0.026	0.035	

Bus (DN)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	Mini Bus	Passenger	1.73	2.70	4.43	16.97	26.45	43.42	0.005	0.012	0.017	0.085
2	Mini Bus	Passenger	1.99	3.20	5.19	19.54	31.38	50.92	0.008	0.024	0.032	
3	Mini Bus	Passenger	3.542	4.669	8.21	34.74	45.79	80.53	0.082	0.107	0.189	
4	Mini Bus	Passenger	3.864	5.7356	9.60	37.89	56.25	94.14	0.116	0.244	0.360	
5	Mini Bus	Passenger	2.4553	3.0993	5.55	24.08	30.39	54.47	0.019	0.021	0.040	
6	Mini Bus	Passenger	1.8515	2.8779	4.73	18.16	28.22	46.38	0.006	0.015	0.022	
7	Mini Bus	Passenger	2.0528	3.2804	5.33	20.13	32.17	52.30	0.009	0.026	0.035	
8	Mini Bus	Passenger	1.9924	2.898	4.89	19.54	28.42	47.96	0.008	0.016	0.024	
9	Mini Bus	Passenger	2.8779	2.4754	5.35	28.22	24.28	52.50	0.036	0.008	0.044	

Appendix-VI

VDF Calculations (LCV)

LCV (UP)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	LCV	Animal Food	1.35	1.63	3.00	13.22	15.98	29.20	0.002	0.004	0.005	0.012
2	LCV	Gas Cylender	1.37	1.71	3.00	13.42	16.77	30.19	0.002	0.004	0.006	
3	LCV	Cement	1.69	2.09	4.00	16.57	20.52	37.10	0.004	0.010	0.014	
4	LCV	Transformer	1.37	1.79	3.00	13.42	17.56	30.98	0.002	0.005	0.007	
5	LCV	Gas Cylender	1.43	2.07	4.00	14.01	20.32	34.33	0.002	0.010	0.012	
6	LCV	Empty	1.07	0.89	2.00	10.46	8.68	19.14	0.001	0.000	0.001	
7	LCV	Fruits	1.77	2.39	4.00	17.36	23.48	40.84	0.005	0.017	0.022	
8	LCV	Furniture	1.45	1.79	3.00	14.21	17.56	31.77	0.002	0.005	0.008	
9	LCV	Sugar	1.85	2.17	4.00	18.15	21.31	39.46	0.006	0.012	0.018	
10	LCV	Cement	1.57	2.09	4.00	15.39	20.52	35.91	0.003	0.010	0.013	
11	LCV	Khad	1.27	1.63	3.00	12.43	15.98	28.41	0.001	0.004	0.005	
12	LCV	Furniture	1.83	2.56	4.00	17.96	25.06	43.02	0.006	0.022	0.028	
13	LCV	Machine	1.61	2.07	4.00	15.79	20.32	36.11	0.003	0.010	0.013	
14	LCV	Kabada	1.85	2.29	4.00	18.15	22.49	40.65	0.006	0.014	0.020	
15	LCV	Sand	1.55	1.89	3.00	15.19	18.55	33.74	0.003	0.007	0.010	
16	LCV	Empty	0.89	0.76	2.00	8.68	7.50	16.18	0.000	0.000	0.000	
17	LCV	Gas Cylinder	1.25	1.57	3.00	12.23	15.39	27.62	0.001	0.003	0.004	
18	LCV	Parcel	1.43	2.07	4.00	14.01	20.32	34.33	0.002	0.010	0.012	
19	LCV	Furniture	1.93	2.56	4.00	18.94	25.06	44.00	0.007	0.022	0.029	
20	LCV	Empty	0.93	0.74	2.00	9.08	7.30	16.38	0.000	0.000	0.001	
21	LCV	Bamboo	1.85	2.56	4.00	18.15	25.06	43.21	0.006	0.022	0.028	
22	LCV	Empty	0.72	0.54	1.00	7.10	5.33	12.43	0.000	0.000	0.000	
23	LCV	Empty	1.01	0.82	2.00	9.87	8.09	17.96	0.001	0.000	0.001	
24	LCV	Paper Roll	1.43	1.97	3.00	14.01	19.34	33.35	0.002	0.008	0.010	
25	LCV	Mixture Machine	1.85	2.80	5.00	18.15	27.43	45.58	0.006	0.032	0.038	
26	LCV	Wood	1.43	2.09	4.00	14.01	20.52	34.53	0.002	0.010	0.012	

LCV (DN)												
Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
1	LCV	Chicken	1.47	2.13	4.00	14.41	20.92	35.33	0.002	0.011	0.013	0.019
2	LCV	Fertilizer Bags	1.19	1.83	3.00	11.64	17.96	29.60	0.001	0.006	0.007	
3	LCV	Branch	1.79	2.60	4.00	17.57	25.46	43.03	0.005	0.024	0.029	
4	LCV	Paddy	1.83	2.64	4.00	17.96	25.85	43.82	0.006	0.025	0.031	
5	LCV	Rice	1.21	1.93	3.00	11.84	18.95	30.79	0.001	0.007	0.008	
6	LCV	Cloths Bundell	1.21	1.79	3.00	11.84	17.57	29.41	0.001	0.005	0.006	
7	LCV	Cement	1.79	2.54	4.00	17.57	24.87	42.43	0.005	0.021	0.027	
8	LCV	Fertilizer Bags	1.8314	2.6565	4.00	17.96	26.05	44.01	0.006	0.026	0.032	
9	LCV	Machine	1.45	1.99	3.00	14.21	19.54	33.75	0.002	0.008	0.010	
10	LCV	Chair	1.80	2.52	4.00	17.66	24.73	42.39	0.005	0.021	0.026	
11	LCV	Empty	0.87	0.78	2.00	8.49	7.70	16.18	0.000	0.000	0.000	
12	LCV	Kabada	1.79	2.37	4.00	17.57	23.29	40.85	0.005	0.016	0.022	
13	LCV	Chemical Tanker	1.87	2.64	5.00	18.36	25.85	44.21	0.006	0.025	0.031	
14	LCV	Plastic Pipe	1.81	2.87	5.00	17.78	28.10	45.89	0.006	0.035	0.041	
15	LCV	Parcel	1.37	1.95	3.00	13.42	19.14	32.57	0.002	0.008	0.009	
16	LCV	Groceries	1.7911	2.576	4.00	17.57	25.26	42.83	0.005	0.023	0.028	

Sl No.	Vehicle Type	Type of Commodity	Wheel Load (Tonnes)		Total Weight (Tonne)	Wheel Load (kN)		Total Weight (kN)	Equivalency Factor		Total VDF	Average VDF
			Axle						Axle			
			Front	Rear		Front	Rear		Front	Rear		
17	LCV	Gitti	1.5496	2.2741	4.00	15.20	22.30	37.50	0.003	0.014	0.017	
18	LCV	Empty	0.5836	0.5434	1.00	5.72	5.33	11.05	0.000	0.000	0.000	
19	LCV	Cement	1.8716	2.415	4.00	18.36	23.68	42.04	0.006	0.018	0.024	
20	LCV	Empty	0.966	0.8251	2.00	9.47	8.09	17.57	0.000	0.000	0.001	
21	LCV	Cement	1.3886	3.3609	5.00	13.62	32.96	46.58	0.002	0.066	0.068	
22	LCV	Wood	1.3685	2.1333	4.00	13.42	20.92	34.34	0.002	0.011	0.013	
23	LCV	Gas Cylinder	1.4691	2.1333	4.00	14.41	20.92	35.33	0.002	0.011	0.013	
24	LCV	Sand	1.0063	1.6704	3.00	9.87	16.38	26.25	0.001	0.004	0.005	
25	LCV	Water Tank	1.449	2.2741	4.00	14.21	22.30	36.51	0.002	0.014	0.016	
26	LCV	Caret Box	1.2679	1.61	3.00	12.43	15.79	28.22	0.001	0.003	0.005	

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

AVERAGE DAILY TRAFFIC (Summary)

Road : Dudhnoi - Dainadubi (8.6 km) **Road No. :** 1 **From:** Saturday, November 17, 2018

Location : At km 3+500 (Near Damra A.S.A. Playground) **Station No. :** 1 **To:** Friday, November 23, 2018

DAY	Motorised Traffic											Non-Motorised Traffic					Grand Total
	Passenger Vehicles					Goods Vehicles				Agri Tractor		Passenger Vehicles		Goods Vehicles			
							Truck								Animal Drawn		
	Two Wheeler	Three Wheeler/ Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer	Cycle	Cycle Rickshaw	Hand Cart	Bullock Cart	Horse Cart	Vehicle (No)
DAY-1 UP	743	518	533	13	10	71	27	2	7	12	2	441	0	1	0	0	**2380**
DAY-1 DN	767	447	505	13	11	70	13	7	2	20	1	482	0	0	0	0	**2338**
DAY-2 UP	861	408	524	24	4	75	16	0	5	12	0	431	0	1	0	0	**2361**
DAY-2 DN	801	447	607	18	9	88	16	6	9	15	0	434	0	6	0	0	**2456**
DAY-3 UP	886	490	504	40	8	81	28	0	8	12	1	364	0	5	1	0	**2428**
DAY-3 DN	1005	498	496	39	3	135	21	3	8	11	1	511	0	7	0	0	**2738**
DAY-4 UP	889	593	538	41	12	112	46	2	3	22	2	404	0	5	0	0	**2669**
DAY-4 DN	961	654	554	35	9	161	34	1	2	19	2	539	0	3	1	0	**2975**
DAY-5 UP	1123	713	572	40	10	210	54	3	9	20	0	475	5	0	0	0	**3234**
DAY-5 DN	1059	725	568	41	20	201	44	6	4	22	2	569	0	6	0	0	**3267**
DAY-6 UP	769	531	514	48	15	144	57	0	5	22	0	445	0	11	1	0	**2562**
DAY-6 DN	898	622	606	43	12	200	54	3	2	25	0	415	0	6	1	0	**2887**
DAY-7 UP	737	622	522	45	10	111	42	1	7	11	0	450	0	10	3	0	**2571**
DAY-7 DN	772	705	489	50	13	127	35	3	4	16	0	522	0	7	1	0	**2744**
Total Weekly Traffic (Nos)	12271	7973	7532	490	146	1786	487	37	75	239	11	6482	5	68	8	0	**37610**

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Total Weekly Traffic (PCU)	6136	7973	7532	735	438	2679	1461	111	338	1076	17	3241	10	204	64	0	**32015**
ADT (NO)	**1753**	**1139**	**1076**	**70**	**21**	**255**	**70**	**5**	**11**	**34**	**2**	**926**	**1**	**10**	**1**	**0**	**5373**
ADT (PCU)	**877**	**1139**	**1076**	**105**	**63**	**383**	**209**	**16**	**48**	**154**	**2**	**463**	**1**	**29**	**9**	**0**	**4573**
PCU Factor	0.5	1.0	1.0	1.5	3.0	1.5	3.0	3.0	4.5	4.5	1.5	0.5	2.0	3.0	8.0	4.0	
AADT (NO)	**1753**	**1139**	**1076**	**70**	**21**	**255**	**70**	**5**	**11**	**34**	**2**	**926**	**1**	**10**	**1**	**0**	**5373**
AADT (PCU)	**877**	**1139**	**1076**	**105**	**63**	**383**	**209**	**16**	**48**	**154**	**2**	**463**	**1**	**29**	**9**	**0**	**4574**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

Traffic Compostion in terms of Nos. and PCU of ADT and AADT

Road : Dudhnoi - Dainadubi (8.6 km)

Location : At km 3+500 (Near Damra A.S.A. Playground)

Traffic Composition	ADT (Nos)	ADT (PCU)	AADT (Nos)	AADT (PCU)
Two Wheeler	1753	877	1753	877
Three Wheeler/ Auto	1139	1139	1139	1139
Car/Jeep/Van/ Taxi	1076	1076	1076	1076
Mini Bus	70	105	70	105
Bus	21	63	21	63
LCV	255	383	255	383
2-Axle Truck	70	209	70	209
3-Axle Truck	5	16	5	16
M-Axle Truck	11	48	11	48
Tractor With Trailer	34	154	34	154
Tractor Without Trailer	2	2	2	2
Total Fast Moving Vehicles(FMV)	**4435**	**4071**	**4435**	**4071**
Cycle	926	463	926	463
Cycle Rickshaw	1	1	1	1
Hand Cart	10	29	10	29
Bullock Cart	1	9	1	9
Horse Cart	0	0	0	0
Total Slow Moving Vehicles(SMV)	**938**	**503**	**938**	**503**
Total	**5373**	**4573**	**5373**	**4573**
CVPD	**432**	**–**	**432**	**–**
Tollable Traffic	**1508**	**1899**	**1508**	**1899**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

Traffic Compostion in terms of Percentage of Nos and PCU of ADT

Road : Dudhnoi - Dainadubi (8.6 km)

Location At km 3+500 (Near Damra A.S.A. Playground)

Traffic Composition	ADT (Nos)	% of Total	ADT (PCU)	% of Total
Two Wheeler	1753	32.63	877	19.17
Three Wheeler/ Auto	1139	21.20	1139	24.91
Car/Jeep/Van/ Taxi	1076	20.03	1076	23.53
Mini Bus	70	1.30	105	2.30
Bus	21	0.39	63	1.37
LCV	255	4.75	383	8.37
2-Axle Truck	70	1.29	209	4.56
3-Axle Truck	5	0.10	16	0.35
M-Axle Truck	11	0.20	48	1.05
Tractor With Trailer	34	0.64	154	3.36
Tractor Without Trailer	2	0.03	2	0.05
Total Fast Moving Vehicles(FMV)	**4435**	**82.55**	**4071**	**89.01**
Cycle	926	17.23	463	10.12
Cycle Rickshaw	1	0.01	1	0.03
Hand Cart	10	0.18	29	0.64
Bullock Cart	1	0.02	9	0.20
Horse Cart	0	0.00	0	0.00
Total Slow Moving Vehicles(SMV)	**938**	**17.45**	**503**	**10.99**
Total	**5373**	**100.00**	**4573**	**100.00**

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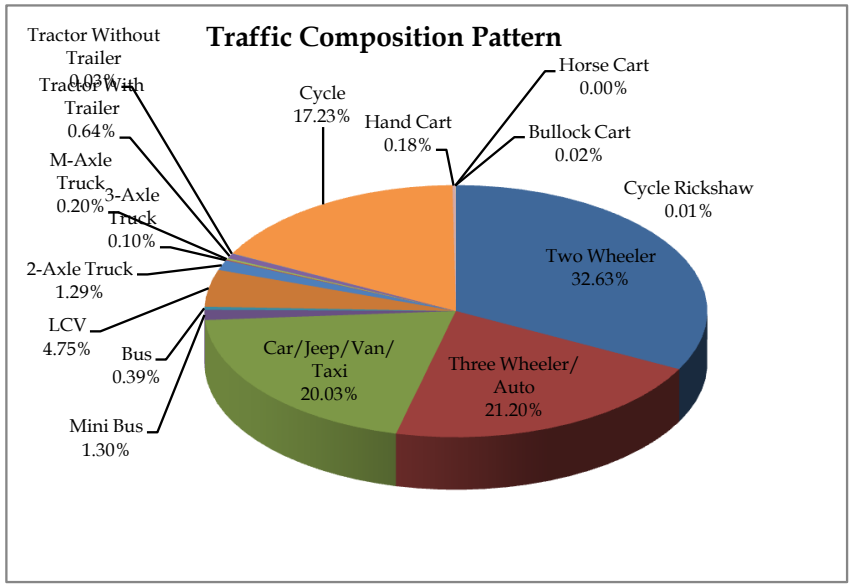
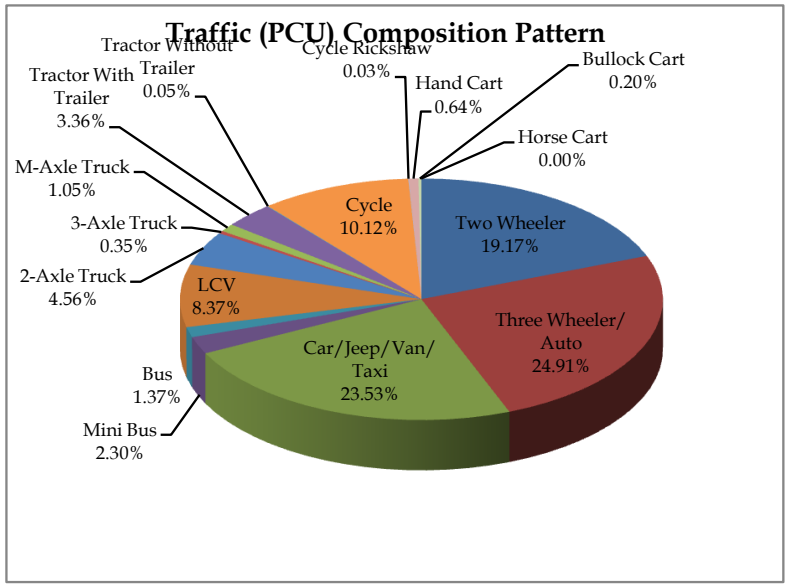
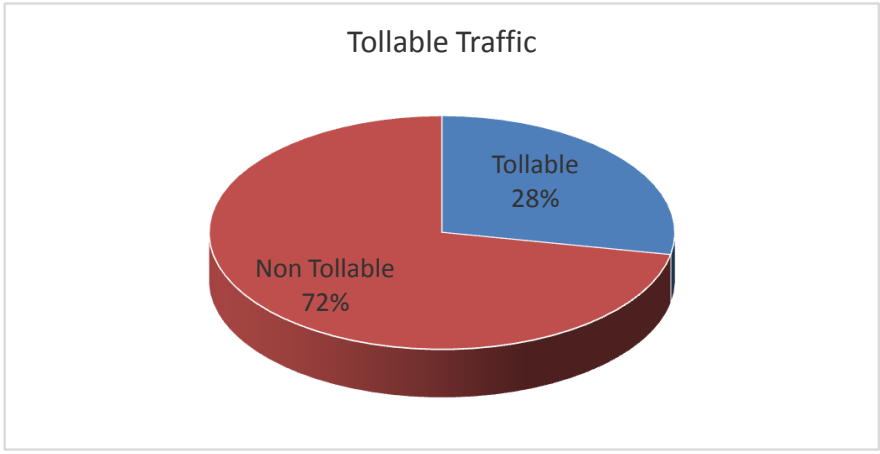
Appendix-VI

Pie Chart for traffic Compositions and Tollable and Non- Tollable traffic







Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

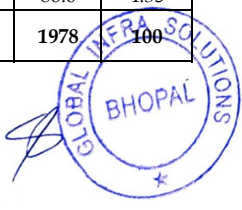
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information:

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Saturday, November 17, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/ Jeep/ Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse Cart						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	34	26	25	0	1	3	3	0	2	2	0	96	102.5	31	0	0	0	0	31	15.5	127	5.34	118.0	5.97
2	9-10	47	45	41	0	1	1	2	0	0	2	0	139	129.0	22	0	0	0	0	22	11.0	161	6.76	140.0	7.08
3	10-11	56	43	46	2	2	4	1	0	0	0	1	155	136.5	46	0	0	0	0	46	23.0	201	8.45	159.5	8.07
4	11-12	77	62	42	2	2	3	1	0	0	0	0	189	159.0	35	0	0	0	0	35	17.5	224	9.41	176.5	8.93
5	12-13	52	49	44	0	2	5	0	0	0	0	1	153	134.0	58	0	0	0	0	58	29.0	211	8.87	163.0	8.24
6	13-14	75	43	34	0	0	1	2	0	0	3	0	158	135.5	38	0	1	0	0	39	22.0	197	8.28	157.5	7.96
7	14-15	72	62	42	0	0	4	0	0	0	4	0	184	164.0	27	0	0	0	0	27	13.5	211	8.87	177.5	8.98
8	15-16	66	44	47	1	0	9	1	0	1	0	0	169	146.5	29	0	0	0	0	29	14.5	198	8.32	161.0	8.14
9	16-17	59	52	43	2	0	5	2	0	0	0	0	163	141.0	46	0	0	0	0	46	23.0	209	8.78	164.0	8.29
10	17-18	49	37	37	1	1	7	1	0	0	0	0	133	116.5	36	0	0	0	0	36	18.0	169	7.10	134.5	6.80
11	18-19	20	11	34	0	0	6	0	0	0	0	0	71	64.0	11	0	0	0	0	11	5.5	82	3.45	69.5	3.51
12	19-20	35	11	27	0	0	7	0	0	0	0	0	80	66.0	6	0	0	0	0	6	3.0	86	3.61	69.0	3.49
13	20-21	12	3	14	0	0	2	2	0	0	0	0	33	32.0	2	0	0	0	0	2	1.0	35	1.47	33.0	1.67
14	21-22	9	3	13	0	0	2	0	0	0	0	0	27	23.5	11	0	0	0	0	11	5.5	38	1.60	29.0	1.47
15	22-23	5	0	9	0	1	1	0	0	0	0	0	16	16.0	0	0	0	0	0	0	0.0	16	0.67	16.0	0.81
16	23-00	4	1	4	0	0	2	1	0	0	0	0	12	13.0	0	0	0	0	0	0	0.0	12	0.50	13.0	0.66
17	00-1	0	0	0	0	0	1	1	0	0	0	0	2	4.5	0	0	0	0	0	0	0.0	2	0.08	4.5	0.23
18	1-2	1	0	2	0	0	0	3	0	0	0	0	6	11.5	0	0	0	0	0	0	0.0	6	0.25	11.5	0.58
19	2-3	2	0	2	0	0	1	0	0	0	0	0	5	4.5	0	0	0	0	0	0	0.0	5	0.21	4.5	0.23
20	3-4	0	0	2	0	0	3	1	0	0	0	0	6	9.5	0	0	0	0	0	0	0.0	6	0.25	9.5	0.48
21	4-5	0	0	1	1	0	0	2	0	0	0	0	4	8.5	0	0	0	0	0	0	0.0	4	0.17	8.5	0.43
22	5-6	8	1	3	0	0	0	0	1	0	0	0	13	11.0	6	0	0	0	0	6	3.0	19	0.80	14.0	0.71
23	6-7	21	4	8	1	0	0	1	1	4	0	0	40	48.0	20	0	0	0	0	20	10.0	60	2.52	58.0	2.93
24	7-8	39	21	13	3	0	4	3	0	0	1	0	84	77.5	17	0	0	0	0	17	8.5	101	4.24	86.0	4.35
Total in numbers		**743**	**518**	**533**	**13**	**10**	**71**	**27**	**2**	**7**	**12**	**2**	**1938**	**1754**	**441**	**0**	**1**	**0**	**0**	**442**	**224**	**2380**	**100**	**1978**	**100**



Appendix-VI

% of modal split of number	31	22	22.39	0.55	0.42	2.98	1.13	0.08	0.29	0.50	0.08	**81.43**		18.53	0.00	0.04	0.00	0.00	**18.57**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	371.5	518	533	19.5	30	106.5	81	6	31.5	54	3		**1754.0**	220.5	0	3	0	0		**223.5**			**1977.5**	
% of Total P.C.U.	18.79	26.19	26.95	0.99	1.52	5.39	4.10	0.30	1.59	2.73	0.15		**88.70**	11.15	0.00	0.15	0.00	0.00		**11.30**				**100.0**

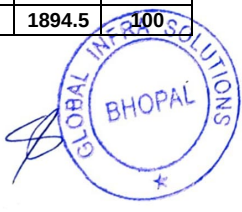
GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

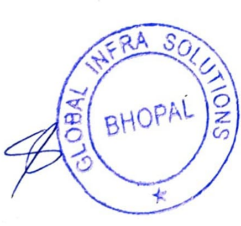
HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

Road : Dudhnoi - Dainadubi (8.6 km)
Road No. : 1
Direction : Dainadubi - Dudhnoi
Station No. : 1
Addl. Information: 0
Location : At km 3+500 (Near Damra A.S.A. Playground)
Date & Day : Saturday, November 17, 2018
Weather: Normal
Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	18	13	17	0	0	1	2	0	0	0	0	51	46.5	19	0	0	0	0	19	9.5	70	2.99	56.0	2.96
2	9-10	33	26	28	1	3	2	2	0	0	1	0	96	94.5	36	0	0	0	0	36	18.0	132	5.65	112.5	5.94
3	10-11	51	48	41	3	3	3	2	0	0	1	0	152	143.0	40	0	0	0	0	40	20.0	192	8.21	163.0	8.60
4	11-12	62	55	44	2	0	4	2	1	0	1	0	171	152.5	46	0	0	0	0	46	23.0	217	9.28	175.5	9.26
5	12-13	70	53	49	0	0	4	2	1	0	0	0	179	152.0	58	0	0	0	0	58	29.0	237	10.14	181.0	9.55
6	13-14	67	47	32	0	1	7	1	2	0	2	0	159	144.0	54	0	0	0	0	54	27.0	213	9.11	171.0	9.03
7	14-15	47	58	43	4	3	4	1	1	2	2	1	166	171.0	24	0	0	0	0	24	12.0	190	8.13	183.0	9.66
8	15-16	101	48	53	0	0	6	1	0	0	1	0	210	168.0	46	0	0	0	0	46	23.0	256	10.95	191.0	10.08
9	16-17	95	43	40	2	1	10	0	1	0	8	0	200	190.5	75	0	0	0	0	75	37.5	275	11.76	228.0	12.03
10	17-18	73	39	53	1	0	12	0	0	0	4	0	182	166.0	31	0	0	0	0	31	15.5	213	9.11	181.5	9.58
11	18-19	52	4	24	0	0	12	0	0	0	0	0	92	72.0	12	0	0	0	0	12	6.0	104	4.45	78.0	4.12
12	19-20	35	0	16	0	0	1	0	0	0	0	0	52	35.0	6	0	0	0	0	6	3.0	58	2.48	38.0	2.01
13	20-21	25	1	13	0	0	2	0	1	0	0	0	42	32.5	1	0	0	0	0	1	0.5	43	1.84	33.0	1.74
14	21-22	9	1	8	0	0	1	0	0	0	0	0	19	15.0	0	0	0	0	0	0	0.0	19	0.81	15.0	0.79
15	22-23	6	1	5	0	0	0	0	0	0	0	0	12	9.0	0	0	0	0	0	0	0.0	12	0.51	9.0	0.48
16	23-00	3	0	3	0	0	1	0	0	0	0	0	7	6.0	0	0	0	0	0	0	0.0	7	0.30	6.0	0.32
17	00-1	0	0	1	0	0	0	0	0	0	0	0	1	1.0	0	0	0	0	0	0	0.0	1	0.04	1.0	0.05
18	1-2	2	0	4	0	0	0	0	0	0	0	0	6	5.0	0	0	0	0	0	0	0.0	6	0.26	5.0	0.26
19	2-3	0	0	1	0	0	0	0	0	0	0	0	1	1.0	0	0	0	0	0	0	0.0	1	0.04	1.0	0.05
20	3-4	0	0	3	0	0	0	0	0	0	0	0	3	3.0	0	0	0	0	0	0	0.0	3	0.13	3.0	0.16
21	4-5	1	0	1	0	0	0	0	0	0	0	0	2	1.5	0	0	0	0	0	0	0.0	2	0.09	1.5	0.08
22	5-6	3	1	3	0	0	0	0	0	0	0	0	7	5.5	11	0	0	0	0	11	5.5	18	0.77	11.0	0.58
23	6-7	4	5	11	0	0	0	0	0	0	0	0	20	18.0	12	0	0	0	0	12	6.0	32	1.37	24.0	1.27
24	7-8	10	4	12	0	0	0	0	0	0	0	0	26	21.0	11	0	0	0	0	11	5.5	37	1.58	26.5	1.40
Total in numbers		**767**	**447**	**505**	**13**	**11**	**70**	**13**	**7**	**2**	**20**	**1**	**1856**	**1653.5**	**482**	**0**	**0**	**0**	**0**	**482**	**241**	**2338**	**100**	**1894.5**	**100**



% of modal split of number	33	19	21.60	1	0.47	3	0.56	0	0.09	1	0.04	**79.38**					0.00	0.00	**0.00**			**79.4**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	383.5	447	505	19.5	33	105	39	21	9	90	1.5		**1653.5**	241	0	0	0	0		**241.0**			**1894.5**	
% of Total P.C.U.	20.24	23.59	26.66	1.03	1.74	5.54	2.06	1.11	0.48	4.75	0.08		**87.28**	12.72	0.00	0.00	0.00	0.00		**12.72**				**100.0**



Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

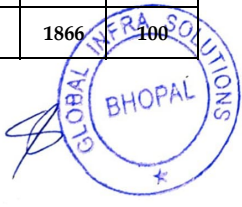
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Sunday, November 18, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	Truck			Agri Tractor				Cycle	Cycle Rickshaw		Bullock Cart	Horse						
								2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer														
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	105	41	18	2	0	3	0	0	0	1	0	170	123.5	16	0	0	0	0	16	8.0	186	7.88	131.5	7.05
2	9-10	94	38	26	3	0	3	0	0	0	1	0	165	124.5	35	0	1	0	0	36	20.5	201	8.51	145.0	7.77
3	10-11	64	32	28	3	0	0	1	0	0	0	0	128	99.5	28	0	0	0	0	28	14.0	156	6.61	113.5	6.08
4	11-12	88	43	33	2	1	3	0	0	0	0	0	170	130.5	34	0	0	0	0	34	17.0	204	8.64	147.5	7.90
5	12-13	66	23	32	0	0	6	0	0	0	0	0	127	97.0	22	0	0	0	0	22	11.0	149	6.31	108.0	5.79
6	13-14	39	23	24	0	0	5	0	0	0	0	0	91	74.0	33	0	0	0	0	33	16.5	124	5.25	90.5	4.85
7	14-15	55	45	48	0	0	7	2	0	0	0	0	157	137.0	49	0	0	0	0	49	24.5	206	8.73	161.5	8.65
8	15-16	67	42	55	1	1	4	0	0	2	3	0	175	163.5	40	0	0	0	0	40	20.0	215	9.11	183.5	9.83
9	16-17	65	37	51	0	0	3	0	0	0	0	0	156	125.0	40	0	0	0	0	40	20.0	196	8.30	145.0	7.77
10	17-18	62	19	54	1	0	6	0	0	0	0	0	142	114.5	26	0	0	0	0	26	13.0	168	7.12	127.5	6.83
11	18-19	20	8	38	1	0	2	4	0	0	2	0	75	81.5	10	0	0	0	0	10	5.0	85	3.60	86.5	4.64
12	19-20	19	4	24	0	0	1	2	0	0	0	0	50	45.0	5	0	0	0	0	5	2.5	55	2.33	47.5	2.55
13	20-21	12	2	23	0	0	1	1	0	0	0	0	39	35.5	4	0	0	0	0	4	2.0	43	1.82	37.5	2.01
14	21-22	8	0	6	0	0	2	0	0	0	0	0	16	13.0	4	0	0	0	0	4	2.0	20	0.85	15.0	0.80
15	22-23	7	0	10	0	0	0	1	0	0	0	0	18	16.5	0	0	0	0	0	0	0.0	18	0.76	16.5	0.88
16	23-00	0	1	8	0	0	0	0	0	0	0	0	9	9.0	0	0	0	0	0	0	0.0	9	0.38	9.0	0.48
17	00-1	0	0	4	0	1	0	0	0	0	0	0	5	7.0	0	0	0	0	0	0	0.0	5	0.21	7.0	0.38
18	1-2	1	0	1	0	0	0	0	0	0	0	0	2	1.5	0	0	0	0	0	0	0.0	2	0.08	1.5	0.08
19	2-3	1	0	4	0	0	1	0	0	0	0	0	6	6.0	0	0	0	0	0	0	0.0	6	0.25	6.0	0.32
20	3-4	0	1	0	0	0	2	0	0	0	0	0	3	4.0	0	0	0	0	0	0	0.0	3	0.13	4.0	0.21
21	4-5	6	15	5	1	0	12	3	0	0	0	0	42	51.5	6	0	0	0	0	6	3.0	48	2.03	54.5	2.92
22	5-6	14	10	8	4	0	9	1	0	0	2	0	48	56.5	24	0	0	0	0	24	12.0	72	3.05	68.5	3.67
23	6-7	32	9	13	5	1	3	1	0	2	2	0	68	74.0	29	0	0	0	0	29	14.5	97	4.11	88.5	4.74
24	7-8	36	15	11	1	0	2	0	0	1	1	0	67	57.5	26	0	0	0	0	26	13.0	93	3.94	70.5	3.78
Total in numbers		**861**	**408**	**524**	**24**	**4**	**75**	**16**	**0**	**5**	**12**	**0**	**1929**	**1648**	**431**	**0**	**1**	**0**	**0**	**432**	**219**	**2361**	**100**	**1866**	**100**



% of modal split of number	36	17	22.19	1.02	0.17	3.18	0.68	0.00	0.21	0.51	0.00	**81.70**		18.25	0.00	0.04	0.00	0.00	**18.3**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	430.5	408	524	36	12	112.5	48	0	22.5	54	0		**1647.5**	215.5	0	3	0	0		**218.5**			**1866.0**	
% of Total P.C.U.	23.07	21.86	28.08	1.93	0.64	6.03	2.57	0.00	1.21	2.89	0.00		**88.29**	11.55	0.00	0.16	0.00	0.00		**11.71**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Sunday, November 18, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	Truck			Agri Tractor				Cycle	Cycle Rickshaw		Bullock Cart	Horse						
								2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer														
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	96	50	52	3	1	6	0	0	1	0	0	209	171.0	26	0	1	0	0	27	16.0	236	9.61	187.0	9.12
2	9-10	79	36	33	3	1	8	0	0	3	2	0	165	150.5	42	0	0	0	0	42	21.0	207	8.43	171.5	8.37
3	10-11	42	33	37	0	1	2	0	0	0	2	0	117	106.0	42	0	0	0	0	42	21.0	159	6.47	127.0	6.20
4	11-12	58	35	41	2	0	6	0	0	1	0	0	143	121.5	31	0	0	0	0	31	15.5	174	7.08	137.0	6.68
5	12-13	92	30	51	1	1	7	2	0	0	0	0	184	148.0	58	0	0	0	0	58	29.0	242	9.85	177.0	8.64
6	13-14	62	32	26	3	1	7	0	0	0	0	0	131	107.0	25	0	0	0	0	25	12.5	156	6.35	119.5	5.83
7	14-15	61	55	56	0	1	4	3	1	1	1	0	183	171.5	37	0	3	0	0	40	27.5	223	9.08	199.0	9.71
8	15-16	86	44	55	0	0	4	0	0	1	1	0	191	157.0	47	0	1	0	0	48	26.5	239	9.73	183.5	8.95
9	16-17	89	43	72	0	0	4	1	0	0	2	0	211	177.5	43	0	0	0	0	43	21.5	254	10.34	199.0	9.71
10	17-18	50	30	65	1	0	8	2	0	0	5	0	161	162.0	33	0	0	0	0	33	16.5	194	7.90	178.5	8.71
11	18-19	30	23	35	0	1	12	1	3	0	0	0	105	106.0	12	0	0	0	0	12	6.0	117	4.76	112.0	5.46
12	19-20	16	9	10	1	0	2	0	0	1	0	0	39	36.0	6	0	0	0	0	6	3.0	45	1.83	39.0	1.90
13	20-21	9	6	11	0	0	3	2	0	0	0	0	31	32.0	1	0	0	0	0	1	0.5	32	1.30	32.5	1.59
14	21-22	6	1	5	0	0	4	0	0	1	0	0	17	19.5	0	0	1	0	0	1	3.0	18	0.73	22.5	1.10
15	22-23	0	0	6	0	0	1	0	0	0	0	0	7	7.5	1	0	0	0	0	1	0.5	8	0.33	8.0	0.39
16	23-00	0	1	5	0	0	1	0	2	0	0	0	9	13.5	0	0	0	0	0	0	0.0	9	0.37	13.5	0.66
17	00-1	0	0	1	0	0	1	2	0	0	0	0	4	8.5	0	0	0	0	0	0	0.0	4	0.16	8.5	0.41
18	1-2	0	0	2	0	0	0	0	0	0	0	0	2	2.0	0	0	0	0	0	0	0.0	2	0.08	2.0	0.10
19	2-3	3	0	1	0	0	0	0	0	0	0	0	4	2.5	0	0	0	0	0	0	0.0	4	0.16	2.5	0.12
20	3-4	0	0	3	0	0	0	3	0	0	0	0	6	12.0	0	0	0	0	0	0	0.0	6	0.24	12.0	0.59
21	4-5	2	1	9	0	0	3	0	0	0	0	0	15	15.5	0	0	0	0	0	0	0.0	15	0.61	15.5	0.76
22	5-6	0	1	2	0	0	0	0	0	0	0	0	3	3.0	2	0	0	0	0	2	1.0	5	0.20	4.0	0.20
23	6-7	8	7	6	1	0	2	0	0	0	1	0	25	26.0	12	0	0	0	0	12	6.0	37	1.51	32.0	1.56
24	7-8	12	10	23	3	2	3	0	0	0	1	0	54	58.5	16	0	0	0	0	16	8.0	70	2.85	66.5	3.24
Total in numbers		**801**	**447**	**607**	**18**	**9**	**88**	**16**	**6**	**9**	**15**	**0**	**2016**	**1814.5**	**434**	**0**	**6**	**0**	**0**	**440**	**235**	**2456**	**100**	**2049.5**	**100**

GLOBAL INFRA SOLUTIONS BHOPAL

% of modal split of number	33	18	24.71	1	0.37	4	0.65	0	0.37	1	0.00	**82.08**					0.00	0.00	**0.0**			**82.1**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	400.5	447	607	27	27	132	48	18	40.5	67.5	0		**1814.5**	217	0	18	0	0		**235.0**			**2049.5**	
% of Total P.C.U.	19.54	21.81	29.62	1.32	1.32	6.44	2.34	0.88	1.98	3.29	0.00		**88.53**	10.59	0.00	0.88	0.00	0.00		**11.47**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

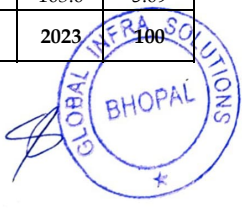
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Monday, November 19, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor														
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	106	74	19	2	0	4	0	0	2	2	0	209	173.0	19	0	0	0	0	19	9.5	228	9.39	182.5	9.02
2	9-10	98	55	35	6	0	5	0	0	2	1	0	202	169.0	41	0	2	0	0	43	26.5	245	10.09	195.5	9.66
3	10-11	69	58	27	1	0	5	2	0	1	2	0	165	148.0	30	0	1	1	0	32	26.0	197	8.11	174.0	8.60
4	11-12	93	58	50	3	1	7	2	0	0	0	1	215	180.0	39	0	0	0	0	39	19.5	254	10.46	199.5	9.86
5	12-13	77	50	46	2	2	7	1	0	1	1	0	187	166.0	19	0	0	0	0	19	9.5	206	8.48	175.5	8.68
6	13-14	70	58	58	1	0	7	1	0	0	0	0	195	166.0	25	0	0	0	0	25	12.5	220	9.06	178.5	8.82
7	14-15	71	24	28	1	0	6	0	0	0	1	0	131	102.5	25	0	0	0	0	25	12.5	156	6.43	115.0	5.68
8	15-16	62	31	38	1	0	3	1	0	0	0	0	136	109.0	27	0	0	0	0	27	13.5	163	6.71	122.5	6.06
9	16-17	50	23	28	2	0	3	0	0	0	0	0	106	83.5	43	0	0	0	0	43	21.5	149	6.14	105.0	5.19
10	17-18	46	8	45	4	0	5	0	0	0	0	0	108	89.5	24	0	0	0	0	24	12.0	132	5.44	101.5	5.02
11	18-19	31	4	29	2	1	2	0	0	0	0	0	69	57.5	11	0	0	0	0	11	5.5	80	3.29	63.0	3.11
12	19-20	13	5	17	0	0	1	1	0	0	0	0	37	33.0	3	0	0	0	0	3	1.5	40	1.65	34.5	1.71
13	20-21	11	5	17	0	0	0	0	0	0	0	0	33	27.5	3	0	0	0	0	3	1.5	36	1.48	29.0	1.43
14	21-22	7	2	10	1	0	1	1	0	0	0	0	22	21.5	6	0	0	0	0	6	3.0	28	1.15	24.5	1.21
15	22-23	6	0	7	0	0	3	4	0	0	0	0	20	26.5	0	0	0	0	0	0	0.0	20	0.82	26.5	1.31
16	23-00	6	0	7	0	0	0	0	0	1	0	0	14	14.5	0	0	0	0	0	0	0.0	14	0.58	14.5	0.72
17	00-1	2	0	3	0	0	1	2	0	0	0	0	8	11.5	0	0	0	0	0	0	0.0	8	0.33	11.5	0.57
18	1-2	1	0	1	0	0	2	1	0	0	0	0	5	7.5	0	0	0	0	0	0	0.0	5	0.21	7.5	0.37
19	2-3	0	0	1	0	0	1	1	0	0	0	0	3	5.5	0	0	0	0	0	0	0.0	3	0.12	5.5	0.27
20	3-4	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0.0	0.00
21	4-5	0	0	4	1	0	3	3	0	0	2	0	13	28.0	1	0	0	0	0	1	0.5	14	0.58	28.5	1.41
22	5-6	12	4	10	3	0	3	4	0	0	0	0	36	41.0	7	0	0	0	0	7	3.5	43	1.77	44.5	2.20
23	6-7	23	10	11	4	3	7	1	0	1	2	0	62	74.5	13	0	0	0	0	13	6.5	75	3.09	81.0	4.00
24	7-8	32	21	13	6	1	5	3	0	0	1	0	82	83.0	28	0	2	0	0	30	20.0	112	4.61	103.0	5.09
Total in numbers		**886**	**490**	**504**	**40**	**8**	**81**	**28**	**0**	**8**	**12**	**1**	**2058**	**1818**	**364**	**0**	**5**	**1**	**0**	**370**	**205**	**2428**	**100**	**2023**	**100**



% of modal split of number	36	20	20.76	1.65	0.33	3.34	1.15	0.00	0.33	0.49	0.04	**84.76**		14.99	0.00	0.21	0.04	0.00	**15.24**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	443	490	504	60	24	121.5	84	0	36	54	1.5		**1818.0**	182	0	15	8	0		**205.0**			**2023.0**	
% of Total P.C.U.	21.90	24.22	24.91	2.97	1.19	6.01	4.15	0.00	1.78	2.67	0.07		**89.87**	9.00	0.00	0.74	0.40	0.00		**10.13**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

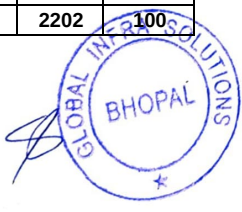
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Monday, November 19, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	Truck			Agri Tractor				Cycle	Cycle Rickshaw		Bullock Cart	Horse						
								2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer													
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	110	50	61	6	0	4	0	0	0	0	0	231	181.0	45	0	0	0	0	45	22.5	276	10.08	203.5	9.24
2	9-10	68	55	35	2	1	4	1	0	0	2	0	168	148.0	31	0	1	0	0	32	18.5	200	7.30	166.5	7.56
3	10-11	63	62	29	3	0	4	0	0	0	2	0	163	142.0	37	0	0	0	0	37	18.5	200	7.30	160.5	7.29
4	11-12	90	58	41	5	0	5	1	0	3	2	0	205	184.5	47	0	1	0	0	48	26.5	253	9.24	211.0	9.58
5	12-13	124	57	64	2	0	8	1	0	1	1	1	259	211.5	46	0	0	0	0	46	23.0	305	11.14	234.5	10.65
6	13-14	58	48	26	4	0	23	2	0	2	0	0	163	158.5	21	0	2	0	0	23	16.5	186	6.79	175.0	7.95
7	14-15	103	56	37	0	0	13	1	0	0	0	0	210	167.0	86	0	0	0	0	86	43.0	296	10.81	210.0	9.54
8	15-16	90	38	25	6	0	15	3	0	1	1	0	179	157.5	58	0	1	0	0	59	32.0	238	8.69	189.5	8.61
9	16-17	81	21	34	3	1	7	0	0	0	0	0	147	113.5	59	0	2	0	0	61	35.5	208	7.60	149.0	6.77
10	17-18	73	16	31	3	0	17	2	0	0	2	0	144	128.5	27	0	0	0	0	27	13.5	171	6.25	142.0	6.45
11	18-19	51	1	29	2	0	15	2	0	0	0	0	100	87.0	12	0	0	0	0	12	6.0	112	4.09	93.0	4.22
12	19-20	23	2	19	1	0	4	0	0	0	0	0	49	40.0	9	0	0	0	0	9	4.5	58	2.12	44.5	2.02
13	20-21	16	0	13	0	1	3	1	0	0	0	0	34	31.5	1	0	0	0	0	1	0.5	35	1.28	32.0	1.45
14	21-22	14	2	5	0	0	0	1	1	0	0	0	23	20.0	1	0	0	0	0	1	0.5	24	0.88	20.5	0.93
15	22-23	6	0	5	0	0	1	2	0	1	0	0	15	20.0	0	0	0	0	0	0	0.0	15	0.55	20.0	0.91
16	23-00	3	0	3	0	0	1	1	0	0	0	0	8	9.0	0	0	0	0	0	0	0.0	8	0.29	9.0	0.41
17	00-1	0	0	3	0	0	2	3	0	0	0	0	8	15.0	0	0	0	0	0	0	0.0	8	0.29	15.0	0.68
18	1-2	1	0	0	0	0	0	0	2	0	0	0	3	6.5	0	0	0	0	0	0	0.0	3	0.11	6.5	0.30
19	2-3	0	0	0	0	0	1	0	0	0	0	0	1	1.5	0	0	0	0	0	0	0.0	1	0.04	1.5	0.07
20	3-4	0	0	1	0	0	1	0	0	0	0	0	2	2.5	0	0	0	0	0	0	0.0	2	0.07	2.5	0.11
21	4-5	1	0	1	0	0	2	0	0	0	0	0	4	4.5	0	0	0	0	0	0	0.0	4	0.15	4.5	0.20
22	5-6	1	2	6	0	0	2	0	0	0	0	0	11	11.5	3	0	0	0	0	3	1.5	14	0.51	13.0	0.59
23	6-7	13	6	13	1	0	2	0	0	0	0	0	35	30.0	11	0	0	0	0	11	5.5	46	1.68	35.5	1.61
24	7-8	16	24	15	1	0	1	0	0	0	1	0	58	54.5	17	0	0	0	0	17	8.5	75	2.74	63.0	2.86
Total in numbers		**1005**	**498**	**496**	**39**	**3**	**135**	**21**	**3**	**8**	**11**	**1**	**2220**	**1925.5**	**511**	**0**	**7**	**0**	**0**	**518**	**276.5**	**2738**	**100**	**2202**	**100**



% of modal split of number	37	18	18.12	1	0.11	5	0.77	0	0.29	0	0.04	**81.08**					0.00	0.00	**0.00**			**81.1**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	502.5	498	496	58.5	9	202.5	63	9	36	49.5	1.5		**1925.5**	255.5	0	21	0	0		**276.5**			**2202.0**	
% of Total P.C.U.	22.82	22.62	22.52	2.66	0.41	9.20	2.86	0.41	1.63	2.25	0.07		**87.44**	11.60	0.00	0.95	0.00	0.00		**12.56**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

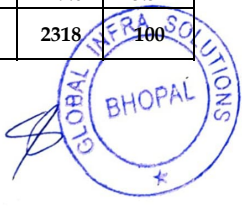
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Tuesday, November 20, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	77	60	37	4	0	12	0	0	0	4	1	195	179.0	20	0	0	0	0	20	10.0	215	8.06	189.0	8.16
2	9-10	81	57	45	3	1	7	1	0	0	2	0	197	172.5	54	0	0	0	0	54	27.0	251	9.40	199.5	8.61
3	10-11	58	67	32	7	1	13	2	1	2	2	0	185	188.0	26	0	0	0	0	26	13.0	211	7.91	201.0	8.67
4	11-12	77	81	39	2	2	11	4	1	0	3	0	220	212.5	34	0	0	0	0	34	17.0	254	9.52	229.5	9.90
5	12-13	72	73	44	5	1	10	1	0	0	2	0	208	190.5	28	0	1	0	0	29	17.0	237	8.88	207.5	8.95
6	13-14	61	66	45	2	1	9	2	0	0	1	0	187	171.5	22	0	0	0	0	22	11.0	209	7.83	182.5	7.87
7	14-15	100	28	36	1	0	4	0	0	0	1	0	170	126.0	35	0	2	0	0	37	23.5	207	7.76	149.5	6.45
8	15-16	66	50	36	2	0	5	1	0	0	1	0	161	137.0	37	0	1	0	0	38	21.5	199	7.46	158.5	6.84
9	16-17	72	40	32	1	0	5	1	0	0	0	1	152	121.5	42	0	0	0	0	42	21.0	194	7.27	142.5	6.15
10	17-18	57	14	56	3	0	5	1	0	0	0	0	136	113.5	25	0	0	0	0	25	12.5	161	6.03	126.0	5.44
11	18-19	36	9	32	0	0	3	4	0	0	1	0	85	80.0	10	0	0	0	0	10	5.0	95	3.56	85.0	3.67
12	19-20	17	4	16	0	0	0	3	0	0	0	0	40	37.5	8	0	0	0	0	8	4.0	48	1.80	41.5	1.79
13	20-21	16	0	15	1	0	3	5	0	0	0	0	40	44.0	3	0	0	0	0	3	1.5	43	1.61	45.5	1.96
14	21-22	11	1	9	0	0	2	1	0	0	0	0	24	21.5	7	0	0	0	0	7	3.5	31	1.16	25.0	1.08
15	22-23	2	0	12	1	0	1	1	0	0	0	0	17	19.0	0	0	0	0	0	0	0.0	17	0.64	19.0	0.82
16	23-00	3	0	4	0	1	0	2	0	0	0	0	10	14.5	0	0	0	0	0	0	0.0	10	0.37	14.5	0.63
17	00-1	0	0	0	0	0	0	3	0	0	0	0	3	9.0	0	0	0	0	0	0	0.0	3	0.11	9.0	0.39
18	1-2	0	0	2	0	0	0	1	0	0	0	0	3	5.0	0	0	0	0	0	0	0.0	3	0.11	5.0	0.22
19	2-3	2	0	1	0	0	1	0	0	0	0	0	4	3.5	0	0	0	0	0	0	0.0	4	0.15	3.5	0.15
20	3-4	0	0	1	0	0	6	0	0	0	0	0	7	10.0	1	0	0	0	0	1	0.5	8	0.30	10.5	0.45
21	4-5	0	0	1	0	0	4	3	0	0	0	0	8	16.0	1	0	0	0	0	1	0.5	9	0.34	16.5	0.71
22	5-6	4	9	5	1	0	4	1	0	0	0	0	24	26.5	8	0	0	0	0	8	4.0	32	1.20	30.5	1.32
23	6-7	34	14	14	4	4	6	4	0	1	0	0	81	88.5	18	0	0	0	0	18	9.0	99	3.71	97.5	4.21
24	7-8	43	20	24	4	1	1	5	0	0	5	0	103	113.5	25	0	1	0	0	26	15.5	129	4.83	129.0	5.57
Total in numbers		**889**	**593**	**538**	**41**	**12**	**112**	**46**	**2**	**3**	**22**	**2**	**2260**	**2101**	**404**	**0**	**5**	**0**	**0**	**409**	**217**	**2669**	**100**	**2318**	**100**



% of modal split of number	33	22	20.16	1.54	0.45	4.20	1.72	0.07	0.11	0.82	0.07	**84.68**		15.14	0.00	0.19	0.00	0.00	**15.32**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	444.5	593	538	61.5	36	168	138	6	13.5	99	3		**2100.5**	202	0	15	0	0		**217.0**			**2317.5**	
% of Total P.C.U.	19.18	25.59	23.21	2.65	1.55	7.25	5.95	0.26	0.58	4.27	0.13		**90.64**	8.72	0.00	0.65	0.00	0.00		**9.36**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

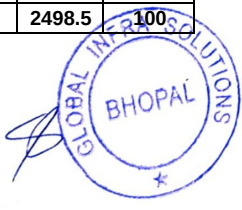
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Tuesday, November 20, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	Truck			Agri Tractor				Cycle	Cycle Rickshaw		Bullock Cart	Horse						
								2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer													
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	60	64	37	6	0	16	0	0	0	1	0	184	168.5	59	0	0	0	0	59	29.5	243	8.17	198.0	7.92
2	9-10	64	74	34	1	2	8	0	0	0	2	0	185	168.5	45	0	0	0	0	45	22.5	230	7.73	191.0	7.64
3	10-11	82	84	39	1	0	7	6	1	1	3	0	224	215.0	36	0	0	0	0	36	18.0	260	8.74	233.0	9.33
4	11-12	84	81	47	6	0	6	0	0	0	1	0	225	192.5	41	0	2	0	0	43	26.5	268	9.01	219.0	8.77
5	12-13	79	71	54	4	1	17	8	0	0	2	1	237	233.5	24	0	1	0	0	25	15.0	262	8.81	248.5	9.95
6	13-14	83	71	48	5	0	26	0	0	0	3	0	236	220.5	39	0	0	0	0	39	19.5	275	9.24	240.0	9.61
7	14-15	118	47	82	3	0	8	1	0	0	0	0	259	207.5	84	0	0	1	0	85	50.0	344	11.56	257.5	10.31
8	15-16	92	34	39	2	1	6	4	0	0	1	0	179	150.5	45	0	0	0	0	45	22.5	224	7.53	173.0	6.92
9	16-17	91	39	49	2	2	14	3	0	0	1	0	201	177.0	71	0	0	0	0	71	35.5	272	9.14	212.5	8.51
10	17-18	74	30	48	1	0	18	0	0	0	2	1	174	154.0	39	0	0	0	0	39	19.5	213	7.16	173.5	6.94
11	18-19	54	4	8	1	0	18	3	0	0	1	0	89	81.0	10	0	0	0	0	10	5.0	99	3.33	86.0	3.44
12	19-20	26	4	15	0	0	3	2	0	0	2	0	52	51.5	8	0	0	0	0	8	4.0	60	2.02	55.5	2.22
13	20-21	12	0	13	0	1	1	0	0	0	0	0	27	23.5	1	0	0	0	0	1	0.5	28	0.94	24.0	0.96
14	21-22	8	0	8	0	1	4	1	0	0	0	0	22	24.0	1	0	0	0	0	1	0.5	23	0.77	24.5	0.98
15	22-23	0	0	3	0	0	1	3	0	0	0	0	7	13.5	0	0	0	0	0	0	0.0	7	0.24	13.5	0.54
16	23-00	2	0	1	0	0	1	0	0	0	0	0	4	3.5	0	0	0	0	0	0	0.0	4	0.13	3.5	0.14
17	00-1	0	2	0	0	0	0	0	0	0	0	0	2	2.0	0	0	0	0	0	0	0.0	2	0.07	2.0	0.08
18	1-2	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0.0	0.00
19	2-3	0	0	1	0	0	1	0	0	0	0	0	2	2.5	0	0	0	0	0	0	0.0	2	0.07	2.5	0.10
20	3-4	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0.0	0.00
21	4-5	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0.0	0.00
22	5-6	1	2	2	0	0	0	0	0	1	0	0	6	9.0	5	0	0	0	0	5	2.5	11	0.37	11.5	0.46
23	6-7	10	18	10	2	1	1	2	0	0	0	0	44	46.5	16	0	0	0	0	16	8.0	60	2.02	54.5	2.18
24	7-8	21	29	16	1	0	5	1	0	0	0	0	73	67.5	15	0	0	0	0	15	7.5	88	2.96	75.0	3.00
Total in numbers		**961**	**654**	**554**	**35**	**9**	**161**	**34**	**1**	**2**	**19**	**2**	**2432**	**2212**	**539**	**0**	**3**	**1**	**0**	**543**	**286.5**	**2975**	**100**	**2498.5**	**100**



% of modal split of number	32	22	18.62	1	0.30	5	1.14	0	0.07	1	0.07	**81.75**					0.03	0.00	**0.03**			**81.8**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	480.5	654	554	52.5	27	241.5	102	3	9	85.5	3		**2212.0**	269.5	0	9	8	0		**286.5**			**2498.5**	
% of Total P.C.U.	19.23	26.18	22.17	2.10	1.08	9.67	4.08	0.12	0.36	3.42	0.12		**88.53**	10.79	0.00	0.36	0.32	0.00		**11.47**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

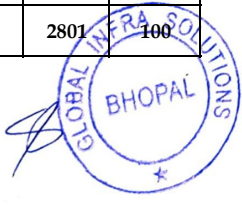
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Wednesday, November 21, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	151	94	47	3	0	8	2	0	0	3	0	308	252.5	85	0	0	0	0	85	42.5	393	12.15	295.0	10.53
2	9-10	131	60	42	3	0	11	0	0	0	3	0	250	202.0	66	1	0	0	0	67	35.0	317	9.80	237.0	8.46
3	10-11	87	67	52	3	0	11	3	0	3	1	0	227	210.5	41	1	0	0	0	42	22.5	269	8.32	233.0	8.32
4	11-12	109	76	48	4	1	7	1	0	0	1	0	247	205.5	35	1	0	0	0	36	19.5	283	8.75	225.0	8.03
5	12-13	84	70	53	2	2	3	2	0	0	2	0	218	193.5	32	0	0	0	0	32	16.0	250	7.73	209.5	7.48
6	13-14	71	62	36	1	0	10	2	0	0	2	0	184	165.0	21	0	0	0	0	21	10.5	205	6.34	175.5	6.27
7	14-15	96	64	44	1	1	7	1	0	0	2	0	216	183.0	28	0	0	0	0	28	14.0	244	7.54	197.0	7.03
8	15-16	70	60	35	3	0	7	1	0	0	2	0	178	157.0	33	0	0	0	0	33	16.5	211	6.52	173.5	6.20
9	16-17	65	33	39	1	0	4	4	0	1	0	0	147	128.5	32	0	0	0	0	32	16.0	179	5.53	144.5	5.16
10	17-18	57	31	41	1	0	4	5	0	1	1	0	141	132.0	27	0	0	0	0	27	13.5	168	5.19	145.5	5.20
11	18-19	38	13	34	0	1	5	3	0	0	0	0	94	85.5	8	0	0	0	0	8	4.0	102	3.15	89.5	3.20
12	19-20	17	5	28	2	1	2	1	0	0	1	0	57	58.0	3	0	0	0	0	3	1.5	60	1.86	59.5	2.12
13	20-21	16	5	11	0	1	6	1	0	0	0	0	40	39.0	2	0	0	0	0	2	1.0	42	1.30	40.0	1.43
14	21-22	9	0	12	0	0	1	2	2	0	0	0	26	30.0	3	0	0	0	0	3	1.5	29	0.90	31.5	1.12
15	22-23	6	1	5	0	0	7	1	0	0	0	0	20	22.5	3	0	0	0	0	3	1.5	23	0.71	24.0	0.86
16	23-00	3	1	3	0	0	2	1	0	0	0	0	10	11.5	0	0	0	0	0	0	0.0	10	0.31	11.5	0.41
17	00-1	1	0	7	0	0	3	4	1	1	1	0	18	36.0	0	0	0	0	0	0	0.0	18	0.56	36.0	1.29
18	1-2	0	0	6	0	0	0	4	0	0	0	0	10	18.0	0	0	0	0	0	0	0.0	10	0.31	18.0	0.64
19	2-3	0	1	0	0	0	1	2	0	0	0	0	4	8.5	0	0	0	0	0	0	0.0	4	0.12	8.5	0.30
20	3-4	0	0	0	0	0	1	0	0	0	0	0	1	1.5	0	0	0	0	0	0	0.0	1	0.03	1.5	0.05
21	4-5	1	1	1	1	0	4	2	0	0	0	0	10	16.0	2	0	0	0	0	2	1.0	12	0.37	17.0	0.61
22	5-6	7	18	0	5	0	31	4	0	1	0	0	66	92.0	6	1	0	0	0	7	5.0	73	2.26	97.0	3.46
23	6-7	60	22	12	5	2	54	7	0	0	0	0	162	179.5	12	0	0	0	0	12	6.0	174	5.38	185.5	6.62
24	7-8	44	29	16	5	1	21	1	0	2	1	0	120	125.5	36	1	0	0	0	37	20.0	157	4.85	145.5	5.20
Total in numbers		**1123**	**713**	**572**	**40**	**10**	**210**	**54**	**3**	**9**	**20**	**0**	**2754**	**2553**	**475**	**5**	**0**	**0**	**0**	**480**	**248**	**3234**	**100**	**2801**	**100**



Appendix-VI

% of modal split of number	35	22	17.69	1.24	0.31	6.49	1.67	0.09	0.28	0.62	0.00	**85.16**		14.69	0.15	0.00	0.00	0.00	**14.8**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	561.5	713	572	60	30	315	162	9	40.5	90	0		**2553.0**	237.5	10	0	0	0		**247.5**			**2800.5**	
% of Total P.C.U.	20.05	25.46	20.42	2.14	1.07	11.25	5.78	0.32	1.45	3.21	0.00		**91.16**	8.48	0.36	0.00	0.00	0.00		**8.84**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

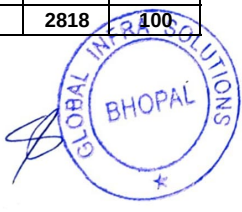
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Wednesday, November 21, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	105	76	58	5	2	8	0	0	0	1	0	255	216.5	49	0	0	0	0	49	24.5	304	9.31	241.0	8.55
2	9-10	99	67	53	1	2	15	1	0	0	1	0	239	207.0	68	0	0	0	0	68	34.0	307	9.40	241.0	8.55
3	10-11	98	74	43	2	0	20	1	0	0	2	1	241	212.5	48	0	1	0	0	49	27.0	290	8.88	239.5	8.50
4	11-12	100	82	52	1	0	16	9	2	0	1	0	263	247.0	78	0	0	0	0	78	39.0	341	10.44	286.0	10.15
5	12-13	124	82	58	2	3	10	1	0	0	0	1	281	233.5	56	0	0	0	0	56	28.0	337	10.32	261.5	9.28
6	13-14	90	69	28	5	0	9	5	1	0	2	0	209	190.0	45	0	1	0	0	46	25.5	255	7.81	215.5	7.65
7	14-15	73	63	51	6	2	12	1	0	0	3	0	211	200.0	55	0	1	0	0	56	30.5	267	8.17	230.5	8.18
8	15-16	75	45	35	5	1	6	1	0	0	1	0	169	144.5	38	0	0	0	0	38	19.0	207	6.34	163.5	5.80
9	16-17	108	47	47	5	3	5	1	0	1	2	0	219	188.5	49	0	1	0	0	50	27.5	269	8.23	216.0	7.67
10	17-18	79	23	47	4	1	21	6	0	0	4	0	185	186.0	26	0	0	0	0	26	13.0	211	6.46	199.0	7.06
11	18-19	43	12	18	1	1	32	4	0	2	2	0	115	134.0	12	0	0	0	0	12	6.0	127	3.89	140.0	4.97
12	19-20	17	6	13	0	0	6	4	0	1	1	0	48	57.5	6	0	0	0	0	6	3.0	54	1.65	60.5	2.15
13	20-21	12	1	19	1	0	4	1	0	0	0	0	38	36.5	2	0	0	0	0	2	1.0	40	1.22	37.5	1.33
14	21-22	8	2	10	0	0	13	2	0	0	1	0	36	46.0	1	0	0	0	0	1	0.5	37	1.13	46.5	1.65
15	22-23	4	0	1	0	0	0	2	1	0	0	0	8	12.0	0	0	0	0	0	0	0.0	8	0.24	12.0	0.43
16	23-00	1	1	3	1	0	2	0	0	0	0	0	8	9.0	1	0	0	0	0	1	0.5	9	0.28	9.5	0.34
17	00-1	0	0	1	0	1	0	0	0	0	1	0	3	8.5	0	0	0	0	0	0	0.0	3	0.09	8.5	0.30
18	1-2	0	0	1	0	0	3	0	0	0	0	0	4	5.5	0	0	0	0	0	0	0.0	4	0.12	5.5	0.20
19	2-3	0	0	1	0	0	0	0	0	0	0	0	1	1.0	0	0	0	0	0	0	0.0	1	0.03	1.0	0.04
20	3-4	0	0	1	0	0	0	2	2	0	0	0	5	13.0	0	0	0	0	0	0	0.0	5	0.15	13.0	0.46
21	4-5	0	1	0	0	0	1	0	0	0	0	0	2	2.5	0	0	0	0	0	0	0.0	2	0.06	2.5	0.09
22	5-6	0	6	1	0	0	3	0	0	0	0	0	10	11.5	4	0	0	0	0	4	2.0	14	0.43	13.5	0.48
23	6-7	5	20	6	0	0	3	1	0	0	0	0	35	36.0	16	0	1	0	0	17	11.0	52	1.59	47.0	1.67
24	7-8	18	48	21	2	4	12	2	0	0	0	0	107	117.0	15	0	1	0	0	16	10.5	123	3.76	127.5	4.52
Total in numbers		**1059**	**725**	**568**	**41**	**20**	**201**	**44**	**6**	**4**	**22**	**2**	**2692**	**2515.5**	**569**	**0**	**6**	**0**	**0**	**575**	**302.5**	**3267**	**100**	**2818**	**100**



Appendix-VI

% of modal split of number	32	22	17.39	1	0.61	6	1.35	0	0.12	1	0.06	**82.40**					0.00	0.00	**0.0**			**82.4**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	529.5	725	568	61.5	60	301.5	132	18	18	99	3		**2515.5**	284.5	0	18	0	0		**302.5**			**2818.0**	
% of Total P.C.U.	18.79	25.73	20.16	2.18	2.13	10.70	4.68	0.64	0.64	3.51	0.11		**89.27**	10.10	0.00	0.64	0.00	0.00		**10.73**				**100.0**

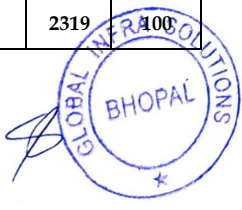
GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

Road : Dudhnoi - Dainadubi (8.6 km)
Road No. : 1
Direction : Dudhnoi - Dainadubi
Station No. : 1
Addl. Information: 0
Location : At km 3+500 (Near Damra A.S.A. Playground)
Date & Day : Thursday, November 22, 2018
Weather: Normal
Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor														
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	70	52	25	4	0	9	0	0	0	3	0	163	145.0	83	0	0	0	0	83	41.5	246	9.60	186.5	8.04
2	9-10	60	43	29	2	2	13	0	0	0	3	0	152	144.0	47	0	1	0	0	48	26.5	200	7.81	170.5	7.35
3	10-11	53	44	39	8	1	8	6	0	1	2	0	162	168.0	29	0	0	1	0	30	22.5	192	7.49	190.5	8.22
4	11-12	70	53	35	5	3	5	1	0	0	1	0	173	154.5	25	0	0	0	0	25	12.5	198	7.73	167.0	7.20
5	12-13	78	44	46	1	4	6	3	0	0	2	0	184	169.5	31	0	0	0	0	31	15.5	215	8.39	185.0	7.98
6	13-14	49	38	56	2	1	8	1	0	0	1	0	156	144.0	28	0	0	0	0	28	14.0	184	7.18	158.0	6.81
7	14-15	78	56	45	0	0	9	0	0	0	1	0	189	158.0	25	0	9	0	0	34	39.5	223	8.70	197.5	8.52
8	15-16	63	50	30	3	0	8	0	0	0	2	0	156	137.0	34	0	1	0	0	35	20.0	191	7.46	157.0	6.77
9	16-17	64	45	41	1	0	6	3	0	0	1	0	161	142.0	45	0	0	0	0	45	22.5	206	8.04	164.5	7.10
10	17-18	43	31	41	0	0	5	3	0	0	0	0	123	110.0	21	0	0	0	0	21	10.5	144	5.62	120.5	5.20
11	18-19	20	8	23	2	1	0	5	0	0	0	0	59	62.0	10	0	0	0	0	10	5.0	69	2.69	67.0	2.89
12	19-20	17	5	22	0	0	3	6	0	0	0	0	53	58.0	2	0	0	0	0	2	1.0	55	2.15	59.0	2.54
13	20-21	12	3	20	0	0	4	3	0	0	0	0	42	44.0	5	0	0	0	0	5	2.5	47	1.83	46.5	2.01
14	21-22	8	2	10	0	0	0	0	0	0	0	0	20	16.0	11	0	0	0	0	11	5.5	31	1.21	21.5	0.93
15	22-23	6	1	13	0	0	3	2	0	0	0	0	25	27.5	3	0	0	0	0	3	1.5	28	1.09	29.0	1.25
16	23-00	6	0	7	0	0	2	2	0	0	0	0	17	19.0	0	0	0	0	0	0	0.0	17	0.66	19.0	0.82
17	00-1	0	1	3	0	1	2	1	0	0	0	0	8	13.0	0	0	0	0	0	0	0.0	8	0.31	13.0	0.56
18	1-2	0	0	0	0	0	0	1	0	0	0	0	1	3.0	0	0	0	0	0	0	0.0	1	0.04	3.0	0.13
19	2-3	0	0	0	0	0	0	1	0	0	0	0	1	3.0	0	0	0	0	0	0	0.0	1	0.04	3.0	0.13
20	3-4	0	0	0	0	0	0	3	0	0	0	0	3	9.0	0	0	0	0	0	0	0.0	3	0.12	9.0	0.39
21	4-5	0	0	1	1	0	10	2	0	0	0	0	14	23.5	0	0	0	0	0	0	0.0	14	0.55	23.5	1.01
22	5-6	4	15	0	8	0	30	3	0	0	0	0	60	83.0	8	0	0	0	0	8	4.0	68	2.65	87.0	3.75
23	6-7	29	17	12	7	1	8	8	0	0	0	0	82	93.0	12	0	0	0	0	12	6.0	94	3.67	99.0	4.27
24	7-8	39	23	16	4	1	5	3	0	4	6	0	101	129.0	26	0	0	0	0	26	13.0	127	4.96	142.0	6.12
Total in numbers		**769**	**531**	**514**	**48**	**15**	**144**	**57**	**0**	**5**	**22**	**0**	**2105**	**2055**	**445**	**0**	**11**	**1**	**0**	**457**	**264**	**2562**	**100**	**2319**	**100**



% of modal split of number	30	21	20.06	1.87	0.59	5.62	2.22	0.00	0.20	0.86	0.00	**82.16**		17.37	0.00	0.43	0.04	0.00	**17.8**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	384.5	531	514	72	45	216	171	0	22.5	99	0		**2055.0**	222.5	0	33	8	0		**263.5**			**2318.5**	
% of Total P.C.U.	16.58	22.90	22.17	3.11	1.94	9.32	7.38	0.00	0.97	4.27	0.00		**88.63**	9.60	0.00	1.42	0.35	0.00		**11.37**				**100.0**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

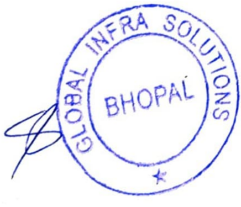
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1
Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0
Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Thursday, November 22, 2018 | Weather: Normal
Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	38	37	29	2	1	5	5	0	0	1	0	118	118.0	39	0	0	0	0	39	19.5	157	5.44	137.5	5.28
2	9-10	67	54	41	5	2	7	1	0	0	2	0	179	164.5	34	0	0	0	0	34	17.0	213	7.38	181.5	6.97
3	10-11	70	56	52	3	0	17	5	0	0	1	0	204	192.5	54	0	0	0	0	54	27.0	258	8.94	219.5	8.43
4	11-12	71	51	62	2	2	5	1	0	1	2	0	197	181.5	24	0	1	0	0	25	15.0	222	7.69	196.5	7.55
5	12-13	66	51	47	5	0	11	2	0	0	1	0	183	165.5	30	0	0	1	0	31	23.0	214	7.41	188.5	7.24
6	13-14	66	48	37	3	1	19	4	0	0	3	0	181	179.5	17	0	0	0	0	17	8.5	198	6.86	188.0	7.22
7	14-15	122	99	99	8	1	19	0	0	0	2	0	350	311.5	34	0	1	0	0	35	20.0	385	13.34	331.5	12.73
8	15-16	111	64	35	3	0	31	0	0	0	2	0	246	214.5	55	0	1	0	0	56	30.5	302	10.46	245.0	9.41
9	16-17	113	60	56	4	2	23	8	2	0	2	0	270	258.0	65	0	3	0	0	68	41.5	338	11.71	299.5	11.50
10	17-18	82	39	43	5	0	22	6	0	0	9	0	206	222.0	26	0	0	0	0	26	13.0	232	8.04	235.0	9.03
11	18-19	28	16	24	1	0	13	4	1	0	0	0	87	90.0	8	0	0	0	0	8	4.0	95	3.29	94.0	3.61
12	19-20	19	2	12	1	0	11	0	0	1	0	0	46	46.0	5	0	0	0	0	5	2.5	51	1.77	48.5	1.86
13	20-21	9	0	6	0	0	1	5	0	0	0	0	21	27.0	1	0	0	0	0	1	0.5	22	0.76	27.5	1.06
14	21-22	6	0	6	0	1	2	3	0	0	0	0	18	24.0	1	0	0	0	0	1	0.5	19	0.66	24.5	0.94
15	22-23	2	1	1	0	0	2	0	0	0	0	0	6	6.0	0	0	0	0	0	0	0.0	6	0.21	6.0	0.23
16	23-00	0	0	1	0	0	1	0	0	0	0	0	2	2.5	0	0	0	0	0	0	0.0	2	0.07	2.5	0.10
17	00-1	0	0	3	0	0	0	0	0	0	0	0	3	3.0	0	0	0	0	0	0	0.0	3	0.10	3.0	0.12
18	1-2	1	0	3	0	0	3	1	0	0	0	0	8	11.0	0	0	0	0	0	0	0.0	8	0.28	11.0	0.42
19	2-3	0	0	1	0	0	1	1	0	0	0	0	3	5.5	0	0	0	0	0	0	0.0	3	0.10	5.5	0.21
20	3-4	0	0	1	0	0	1	1	0	0	0	0	3	5.5	0	0	0	0	0	0	0.0	3	0.10	5.5	0.21
21	4-5	0	0	1	0	0	1	0	0	0	0	0	2	2.5	0	0	0	0	0	0	0.0	2	0.07	2.5	0.10
22	5-6	1	2	2	0	0	0	0	0	0	0	0	5	4.5	4	0	0	0	0	4	2.0	9	0.31	6.5	0.25
23	6-7	13	11	14	0	1	1	2	0	0	0	0	42	42.0	6	0	0	0	0	6	3.0	48	1.66	45.0	1.73
24	7-8	13	31	30	1	1	4	5	0	0	0	0	85	93.0	12	0	0	0	0	12	6.0	97	3.36	99.0	3.80
Total in numbers		**898**	**622**	**606**	**43**	**12**	**200**	**54**	**3**	**2**	**25**	**0**	**2465**	**2370**	**415**	**0**	**6**	**1**	**0**	**422**	**233.5**	**2887**	**100**	**2603.5**	**100**

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

% of modal split of number	31	22	20.99	1	0.42	7	1.87	0	0.07	1	0.00	**85.38**					0.03	0.00	**0.0**			**85.4**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	449	622	606	64.5	36	300	162	9	9	112.5	0		**2370.0**	207.5	0	18	8	0		**233.5**			**2603.5**	
% of Total P.C.U.	17.25	23.89	23.28	2.48	1.38	11.52	6.22	0.35	0.35	4.32	0.00		**91.03**	7.97	0.00	0.69	0.31	0.00		**8.97**				**100.0**



Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (UP)

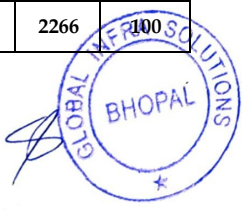
Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dudhnoi - Dainadubi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Friday, November 23, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles			Agricultural Vehicles		Total (No)	Total (PCU)		Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	70	46	28	6	0	5	0	0	2	0	0	157	134.5	79	0	0	0	0	79	39.5	236	9.18	174.0	7.68
2	9-10	69	54	47	3	1	7	0	0	0	0	0	181	153.5	48	0	0	2	0	50	40.0	231	8.98	193.5	8.54
3	10-11	57	68	29	7	1	12	2	0	0	1	0	177	167.5	47	0	0	0	0	47	23.5	224	8.71	191.0	8.43
4	11-12	65	71	38	2	2	7	2	0	2	0	0	189	176.0	27	0	0	0	0	27	13.5	216	8.40	189.5	8.36
5	12-13	66	65	35	2	2	4	2	0	0	0	0	176	154.0	34	0	1	0	0	35	20.0	211	8.21	174.0	7.68
6	13-14	55	67	37	1	1	4	0	0	1	0	0	166	146.5	25	0	1	1	0	27	23.5	193	7.51	170.0	7.50
7	14-15	52	53	57	2	0	5	1	0	0	1	0	171	154.0	32	0	0	0	0	32	16.0	203	7.90	170.0	7.50
8	15-16	61	38	45	3	0	7	1	0	0	1	0	156	136.0	37	0	0	0	0	37	18.5	193	7.51	154.5	6.82
9	16-17	68	38	29	2	0	4	1	0	0	0	0	142	113.0	30	0	0	0	0	30	15.0	172	6.69	128.0	5.65
10	17-18	47	39	57	0	1	9	6	0	0	0	0	159	154.0	25	0	1	0	0	26	15.5	185	7.20	169.5	7.48
11	18-19	22	12	31	1	0	3	2	0	0	0	0	71	66.0	10	0	0	0	0	10	5.0	81	3.15	71.0	3.13
12	19-20	15	8	21	0	0	4	2	0	0	0	0	50	48.5	2	0	0	0	0	2	1.0	52	2.02	49.5	2.18
13	20-21	11	6	12	0	0	8	1	0	0	1	0	39	43.0	6	0	0	0	0	6	3.0	45	1.75	46.0	2.03
14	21-22	9	1	7	0	0	3	0	0	0	0	0	20	17.0	0	0	7	0	0	7	21.0	27	1.05	38.0	1.68
15	22-23	4	1	5	0	0	3	1	1	0	0	0	15	18.5	4	0	0	0	0	4	2.0	19	0.74	20.5	0.90
16	23-00	4	1	4	0	0	0	5	0	1	0	0	15	26.5	0	0	0	0	0	0	0.0	15	0.58	26.5	1.17
17	00-1	0	0	4	0	0	0	2	0	0	0	0	6	10.0	0	0	0	0	0	0	0.0	6	0.23	10.0	0.44
18	1-2	1	0	1	0	0	1	3	0	0	0	0	6	12.0	0	0	0	0	0	0	0.0	6	0.23	12.0	0.53
19	2-3	1	0	2	0	0	0	1	0	0	0	0	4	5.5	1	0	0	0	0	1	0.5	5	0.19	6.0	0.26
20	3-4	1	0	0	0	0	2	3	0	0	0	0	6	12.5	0	0	0	0	0	0	0.0	6	0.23	12.5	0.55
21	4-5	0	0	3	1	0	10	4	0	0	0	0	18	31.5	0	0	0	0	0	0	0.0	18	0.70	31.5	1.39
22	5-6	8	10	6	2	0	6	1	0	0	0	0	33	35.0	8	0	0	0	0	8	4.0	41	1.59	39.0	1.72
23	6-7	23	18	9	8	2	4	1	0	0	3	0	68	79.0	16	0	0	0	0	16	8.0	84	3.27	87.0	3.84
24	7-8	28	26	15	5	0	3	1	0	1	4	0	83	92.5	19	0	0	0	0	19	9.5	102	3.97	102.0	4.50
Total in numbers		**737**	**622**	**522**	**45**	**10**	**111**	**42**	**1**	**7**	**11**	**0**	**2108**	**1987**	**450**	**0**	**10**	**3**	**0**	**463**	**279**	**2571**	**100**	**2266**	**100**



Appendix-VI

% of modal split of number	29	24	20.30	1.75	0.39	4.32	1.63	0.04	0.27	0.43	0.00	**81.99**		17.50	0.00	0.39	0.12	0.00	**18.01**			**100.0**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	368.5	622	522	67.5	30	166.5	126	3	31.5	49.5	0		**1986.5**	225	0	30	24	0		**279.0**			**2265.5**	
% of Total P.C.U.	16.27	27.46	23.04	2.98	1.32	7.35	5.56	0.13	1.39	2.18	0.00		**87.68**	9.93	0.00	1.32	1.06	0.00		**12.32**				**100.0**

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Appendix-VI

HOURLY ABSTRACT OF CLASSIFIED TRAFFIC VOLUME COUNT SURVEY (DOWN)

Road : Dudhnoi - Dainadubi (8.6 km) | Road No. : 1

Direction : Dainadubi - Dudhnoi | Station No. : 1 | Addl. Information: 0

Location : At km 3+500 (Near Damra A.S.A. Playground) | Date & Day : Friday, November 23, 2018 | Weather: Normal

Hour : 8 AM to 8 AM

Sl No	TIME (Hours)	FAST MOVING VEHICLES													SLOW MOVING VEHICLES							Total in No (Fast + Slow)	Hourly % in No (Fast + Slow)	Total PCU (Fast + Slow)	Hourly % in PCU (Fast + Slow)
		Passenger Vehicles					Goods Vehicles				Agricultural Vehicles		Total (No)	Total (PCU)	Passenger Vehicles		Hand Cart	Animal Drawn		Total Slow (No)	Total Slow (PCU)				
								Truck			Agri Tractor															
		Two Wheeler	Three Wheeler / Auto	Car/Jeep/Van/ Taxi	Mini Bus	Bus	LCV	2-Axle	3-Axle	M-Axle	With Trailer	Without Trailer			Cycle	Cycle Rickshaw		Bullock Cart	Horse						
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	8-9	50	58	48	5	2	6	0	0	0	0	0	169	153.5	70	0	1	0	0	71	38.0	240	8.75	191.5	8.05
2	9-10	65	79	39	2	3	17	0	0	0	0	0	205	188.0	72	0	1	0	0	73	39.0	278	10.13	227.0	9.54
3	10-11	68	64	48	6	0	12	0	0	0	0	0	198	173.0	32	0	0	0	0	32	16.0	230	8.38	189.0	7.95
4	11-12	73	75	40	2	0	9	0	0	0	0	0	199	168.0	32	0	1	0	0	33	19.0	232	8.45	187.0	7.86
5	12-13	74	67	35	4	2	6	3	0	0	0	0	191	169.0	25	0	1	0	0	26	15.5	217	7.91	184.5	7.76
6	13-14	62	70	34	6	2	7	1	1	0	2	0	185	175.5	25	0	0	0	0	25	12.5	210	7.65	188.0	7.90
7	14-15	60	55	47	4	0	8	1	0	0	1	0	176	157.5	30	0	0	1	0	31	23.0	207	7.54	180.5	7.59
8	15-16	62	46	33	6	0	5	3	0	0	0	0	155	135.5	44	0	0	0	0	44	22.0	199	7.25	157.5	6.62
9	16-17	91	40	36	5	1	4	2	0	3	1	0	183	162.0	68	0	0	0	0	68	34.0	251	9.15	196.0	8.24
10	17-18	63	42	36	3	2	12	6	0	1	10	0	175	205.5	49	0	2	0	0	51	30.5	226	8.24	236.0	9.92
11	18-19	36	8	27	3	0	9	7	1	0	1	0	92	99.5	9	0	0	0	0	9	4.5	101	3.68	104.0	4.37
12	19-20	15	6	16	1	0	9	4	0	0	1	0	52	61.0	6	0	0	0	0	6	3.0	58	2.11	64.0	2.69
13	20-21	8	3	6	0	0	6	1	0	0	0	0	24	25.0	2	0	0	0	0	2	1.0	26	0.95	26.0	1.09
14	21-22	6	1	9	0	0	4	3	0	0	0	0	23	28.0	2	0	0	0	0	2	1.0	25	0.91	29.0	1.22
15	22-23	2	2	0	0	0	4	4	0	0	0	0	12	21.0	0	0	0	0	0	0	0.0	12	0.44	21.0	0.88
16	23-00	0	0	1	0	0	1	0	1	0	0	0	3	5.5	0	0	0	0	0	0	0.0	3	0.11	5.5	0.23
17	00-1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0.0	0.00
18	1-2	0	0	1	0	0	0	0	0	0	0	0	1	1.0	0	0	0	0	0	0	0.0	1	0.04	1.0	0.04
19	2-3	0	0	0	0	0	1	0	0	0	0	0	1	1.5	0	0	0	0	0	0	0.0	1	0.04	1.5	0.06
20	3-4	0	0	0	0	0	1	0	0	0	0	0	1	1.5	0	0	0	0	0	0	0.0	1	0.04	1.5	0.06
21	4-5	0	0	2	0	0	3	0	0	0	0	0	5	6.5	0	0	0	0	0	0	0.0	5	0.18	6.5	0.27
22	5-6	7	12	9	0	0	0	0	0	0	0	0	28	24.5	9	0	0	0	0	9	4.5	37	1.35	29.0	1.22
23	6-7	9	31	11	1	0	2	0	0	0	0	0	54	51.0	18	0	0	0	0	18	9.0	72	2.62	60.0	2.52
24	7-8	21	46	11	2	1	1	0	0	0	0	0	82	75.0	29	0	1	0	0	30	17.5	112	4.08	92.5	3.89
Total in numbers		**772**	**705**	**489**	**50**	**13**	**127**	**35**	**3**	**4**	**16**	**0**	**2214**	**2088.5**	**522**	**0**	**7**	**1**	**0**	**530**	**290**	**2744**	**100**	**2378.5**	**100**

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% of modal split of number	28	26	17.82	2	0.47	5	1.28	0	0.15	1	0.00	**80.69**					0.04	0.00	**0.04**			**80.7**		
PCU conversion factor	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50			0.50	2.00	3.00	8.00	4.00						
P.C.U.	386	705	489	75	39	190.5	105	9	18	72	0		**2088.5**	261	0	21	8	0		**290.0**			**2378.5**	
% of Total P.C.U.	16.23	29.64	20.56	3.15	1.64	8.01	4.41	0.38	0.76	3.03	0.00		**87.81**	10.97	0.00	0.88	0.34	0.00		**12.19**				**100.0**

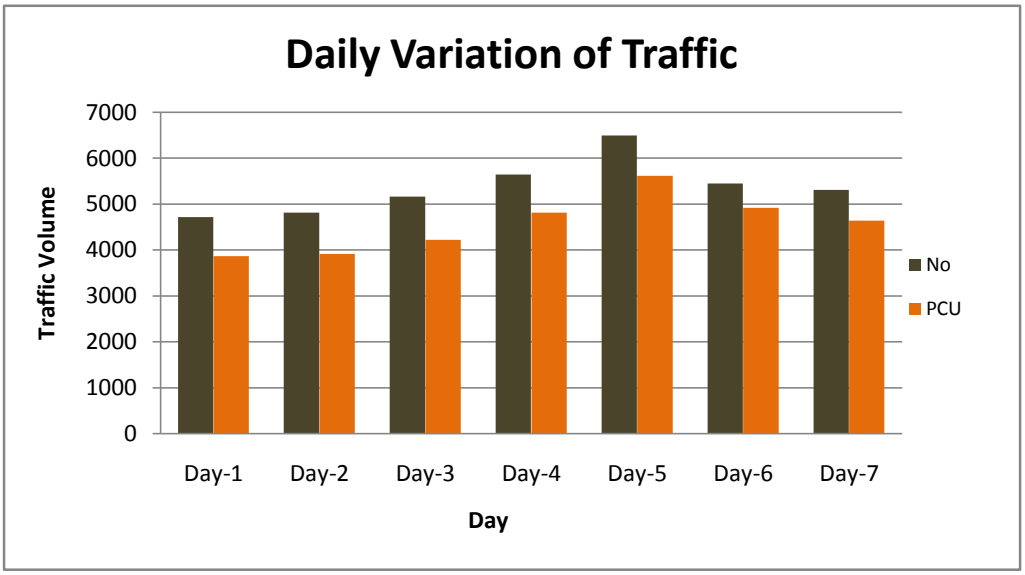
GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

Daily and Hourly variation of Traffic

Road : Dudhnoi - Dainadubi (8.6 km)
Location : At km 3+500 (Near Damra A.S.A. Playground)

Daily Variation of Traffic	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7
Numbers	4718	4817	5166	5644	6501	5449	5315
PCU	3872	3916	4225	4816	5619	4922	4644

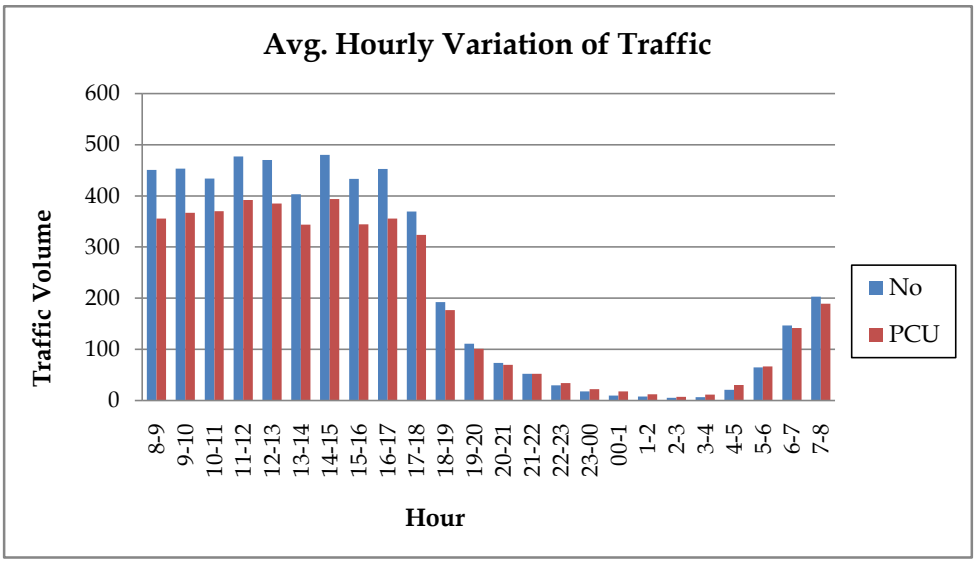


GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

Average Hourly Variation of Traffic

Time (Hour)	Traffic (Number)	Traffic (PCU)	Peak Hour Factor (%)
8-9	451	356	7.78
9-10	453	367	8.03
10-11	434	371	8.10
11-12	477	392	8.58
12-13	470	385	8.43
13-14	404	344	7.53
14-15	**480**	**394**	**8.62**
15-16	434	345	7.54
16-17	453	356	7.79
17-18	370	324	7.09
18-19	193	177	3.87
19-20	111	102	2.22
20-21	74	70	1.53
21-22	53	52	1.15
22-23	30	34	0.75
23-00	18	23	0.49
00-1	10	18	0.40
1-2	8	13	0.28
2-3	6	8	0.16
3-4	7	12	0.26
4-5	21	30	0.67
5-6	65	67	1.47
6-7	147	142	3.11
7-8	203	190	4.15
Total	**5373**	**4573**	



GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

TRAFFIC PROJECTION

Road Name: Dudhnoi - Dainadubi (8.6 km) **Location :** At km 3+500 (Near Damra A.S.A. Playground)

	Traffic Growth Rates																	
Growth Rates	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%		
PCU	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50	0.50	2.00	3.00	8.00	4.00		
Year	**FAST MOVING VEHICLES**											**SLOW MOVING VEHICLES**					**Total (No)**	**Total (PCU)**	**Design Year/ Remark**
	Two Wheeler	**Three Wheeler/ Auto**	**Car/ Jeep/ Van/ Taxi**	**Mini Bus**	**Bus**	**LCV**	**2-Axle**	**3-Axle**	**M-Axle**	**Tractor With Trailer**	**Tractor Without Trailer**	**Cycle**	**Cycle Rickshaw**	**Hand Cart**	**Bullock Cart**	**Horse Cart**			
2018	1753	1139	1076	70	21	255	70	5	11	34	2	926	1	10	1	0	5373	4573	
2019	1841	1196	1130	74	22	268	73	6	11	36	2	972	1	10	1	0	5642	4802	
2020	1933	1256	1186	77	23	281	77	6	12	38	2	1021	1	11	1	0	5924	5042	**Design Period**
2021	**1933**	**1256**	**1186**	**77**	**23**	**281**	**77**	**6**	**12**	**38**	**2**	**1021**	**1**	**11**	**1**	**0**	**5924**	**5042**	
2022	2029	1319	1246	81	24	295	81	6	12	40	2	1072	1	11	1	0	6220	5294	
2023	2131	1384	1308	85	25	310	85	6	13	42	2	1126	1	12	1	0	6531	5559	**Constuction Period**
2024	**2237**	**1454**	**1373**	**89**	**27**	**326**	**89**	**7**	**14**	**44**	**2**	**1182**	**1**	**12**	**1**	**0**	**6857**	**5837**	**1**
2025	2349	1526	1442	94	28	342	93	7	14	46	2	1241	1	13	2	0	7200	6129	**2**
2026	2467	1603	1514	98	29	359	98	7	15	48	2	1303	1	14	2	0	7560	6435	**3**
2027	2590	1683	1590	103	31	377	103	8	16	50	2	1368	1	14	2	0	7938	6757	**4**
2028	**2719**	**1767**	**1669**	**109**	**32**	**396**	**108**	**8**	**17**	**53**	**2**	**1437**	**1**	**15**	**2**	**0**	**8335**	**7095**	**5**
2029	2855	1855	1753	114	34	416	113	9	17	56	3	1508	1	16	2	0	8752	7449	**6**
2030	2998	1948	1840	120	36	436	119	9	18	58	3	1584	1	17	2	0	9189	7822	**7**
2031	3148	2045	1932	126	37	458	125	9	19	61	3	1663	1	17	2	0	9649	8213	**8**
2032	3306	2148	2029	132	39	481	131	10	20	64	3	1746	1	18	2	0	10131	8624	**9**

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Appendix-VI

TRAFFIC PROJECTION

Road Name: Dudhnoi - Dainadubi (8.6 km) **Location :** At km 3+500 (Near Damra A.S.A. Playground)

	Traffic Growth Rates																		
Growth Rates	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%			
PCU	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50	0.50	2.00	3.00	8.00	4.00			
Year	**FAST MOVING VEHICLES**											**SLOW MOVING VEHICLES**					**Total (No)**	**Total (PCU)**	**Design Year/ Remark**
	Two Wheeler	**Three Wheeler/ Auto**	**Car/ Jeep/ Van/ Taxi**	**Mini Bus**	**Bus**	**LCV**	**2-Axle**	**3-Axle**	**M-Axle**	**Tractor With Trailer**	**Tractor Without Trailer**	**Cycle**	**Cycle Rickshaw**	**Hand Cart**	**Bullock Cart**	**Horse Cart**			
2033	**3471**	**2255**	**2130**	**139**	**41**	**505**	**138**	**10**	**21**	**68**	**3**	**1833**	**1**	**19**	**2**	**0**	**10638**	**9055**	**10**
2034	3644	2368	2237	146	43	530	145	11	22	71	3	1925	1	20	2	0	11170	9508	**11**
2035	3827	2486	2349	153	46	557	152	12	23	75	3	2021	2	21	2	0	11728	9983	**12**
2036	4018	2611	2466	160	48	585	159	12	25	78	4	2122	2	22	3	0	12315	10482	**13**
2037	4219	2741	2590	168	50	614	167	13	26	82	4	2229	2	23	3	0	12930	11006	**14**
2038	**4430**	**2878**	**2719**	**177**	**53**	**645**	**176**	**13**	**27**	**86**	**4**	**2340**	**2**	**25**	**3**	**0**	**13577**	**11556**	**15**
2039	4651	3022	2855	186	55	677	185	14	28	91	4	2457	2	26	3	0	14256	12134	**16**
2040	4884	3173	2998	195	58	711	194	15	30	95	4	2580	2	27	3	0	14969	12741	**17**
2041	5128	3332	3148	205	61	746	204	15	31	100	5	2709	2	28	3	0	15717	13378	**18**
2042	5384	3498	3305	215	64	784	214	16	33	105	5	2844	2	30	4	0	16503	14047	**19**
2043	**5654**	**3673**	**3470**	**226**	**67**	**823**	**224**	**17**	**35**	**110**	**5**	**2986**	**2**	**31**	**4**	**0**	**17328**	**14749**	**20**
2044	5936	3857	3644	237	71	864	236	18	36	116	5	3136	2	33	4	0	18194	15487	**21**
2045	6233	4050	3826	249	74	907	247	19	38	121	6	3293	3	35	4	0	19104	16261	**22**
2046	6545	4252	4017	261	78	953	260	20	40	127	6	3457	3	36	4	0	20059	17074	**23**
2047	6872	4465	4218	274	82	1000	273	21	42	134	6	3630	3	38	4	0	21062	17928	**24**
2048	**7216**	**4688**	**4429**	**288**	**86**	**1050**	**286**	**22**	**44**	**141**	**6**	**3812**	**3**	**40**	**5**	**0**	**22115**	**18824**	**25**
2049	7576	4923	4650	303	90	1103	301	23	46	148	7	4002	3	42	5	0	23221	19765	**26**
2050	7955	5169	4883	318	95	1158	316	24	49	155	7	4202	3	44	5	0	24382	20754	**27**
2051	8353	5427	5127	334	99	1216	332	25	51	163	7	4412	3	46	5	0	25601	21791	**28**

Appendix-VI

TRAFFIC PROJECTION

Road Name: Dudhnoi - Dainadubi (8.6 km) **Location :** At km 3+500 (Near Damra A.S.A. Playground)

	Traffic Growth Rates																		
Growth Rates	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%			
PCU	0.50	1.00	1.00	1.50	3.00	1.50	3.00	3.00	4.50	4.50	1.50	0.50	2.00	3.00	8.00	4.00			
Year	**FAST MOVING VEHICLES**											**SLOW MOVING VEHICLES**					**Total (No)**	**Total (PCU)**	**Design Year/ Remark**
	Two Wheeler	**Three Wheeler/ Auto**	**Car/ Jeep/ Van/ Taxi**	**Mini Bus**	**Bus**	**LCV**	**2-Axle**	**3-Axle**	**M-Axle**	**Tractor With Trailer**	**Tractor Without Trailer**	**Cycle**	**Cycle Rickshaw**	**Hand Cart**	**Bullock Cart**	**Horse Cart**			
2052	8771	5699	5383	350	104	1277	348	26	54	171	8	4633	4	49	6	0	26881	22881	**29**
2053	**9209**	**5984**	**5653**	**368**	**110**	**1340**	**365**	**28**	**56**	**179**	**8**	**4865**	**4**	**51**	**6**	**0**	**28225**	**24025**	**30**

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Appendix-VI

LANE REQUIREMENT

Road : Dudhnoi - Dainadubi (8.6 km)

Location : At km 3+500 (Near Damra A.S.A. Playground)

Year	AADT (PCU)	Lane Requirement (LOS B) as per IRC-64-1990	Lane Requirement as per new MoRT&H Circular
2018	4573	Intermediate Lane	2-Lane + P.S
2019	4802	Intermediate Lane	2-Lane + P.S
2020	5042	Intermediate Lane	2-Lane + P.S
2021	5042	Intermediate Lane	2-Lane + P.S
2022	5294	Intermediate Lane	2-Lane + P.S
2023	5559	Intermediate Lane	2-Lane + P.S
2024	5837	Intermediate Lane	2-Lane + P.S
2025	6129	2-Lane	2-Lane + P.S
2026	6435	2-Lane	2-Lane + P.S
2027	6757	2-Lane	2-Lane + P.S
2028	7095	2-Lane	2-Lane + P.S
2029	7449	2-Lane	2-Lane + P.S
2030	7822	2-Lane	2-Lane + P.S
2031	8213	2-Lane	2-Lane + P.S
2032	8624	2-Lane	2-Lane + P.S
2033	9055	2-Lane	2-Lane + P.S
2034	9508	2-Lane	2-Lane + P.S
2035	**9983**	**2-Lane**	**2-Lane + P.S**
2036	10482	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2037	11006	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2038	11556	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2039	12134	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2040	**12741**	**2-Lane**	**2-Lane + P.S, capacity augmentation for 4-lane to be started**
2041	13378	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2042	14047	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2043	14749	2-Lane	2-Lane + P.S, capacity augmentation for 4-lane to be started
2044	15487	2-Lane + P.S	4-Lane
2045	16261	2-Lane + P.S	4-Lane
2046	17074	2-Lane + P.S	4-Lane
2047	17928	2-Lane + P.S	4-Lane
2048	18824	4-Lane	4-Lane
2049	19765	4-Lane	4-Lane
2050	20754	4-Lane	4-Lane
2051	21791	4-Lane	4-Lane
2052	22881	4-Lane	4-Lane
2053	24025	4-Lane	4-Lane

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Appendix-VI

MSA CALCULATION SHEET

Road Name: Dudhnoi - Dainadubi (8.6 km) **Location:** At km 3+500 (Near Damra A.S.A. Playground)

Lane Distribution Factor : 0.50

Year	Mini Bus	Bus	LCV	2 Axle	3 Axle	M Axle	Total yearly CVs (nos.)	Cummulative yearly CVs (nos.)	Yearly Design ESA	Cummulative Design ESA	MSA	Design year
VDF	0.085	0.741	0.019	3.738	5.497	8.655						
2018	70	21	255	70	5	11	Design Period					
2019	74	22	268	73	6	11						
2020	77	23	281	77	6	12						
2021	77	23	281	77	6	12						
2022	81	24	295	81	6	12						
2023	85	25	310	85	6	13	Constuction Period					
2024	89	27	326	89	7	14	201044	**201044**	95020	95020	**0.10**	1
2025	94	28	342	93	7	14	211097	**412141**	99771	194790	**0.19**	2
2026	98	29	359	98	7	15	221651	**633793**	104759	299549	**0.30**	3
2027	103	31	377	103	8	16	232734	**866527**	109997	409546	**0.41**	4
2028	**109**	**32**	**396**	**108**	**8**	**17**	**244371**	**1110897**	**115497**	**525043**	**0.53**	**5**
2029	114	34	416	113	9	17	256589	**1367487**	121272	646315	**0.65**	6
2030	120	36	436	119	9	18	269419	**1636905**	127335	773650	**0.77**	7
2031	126	37	458	125	9	19	282890	**1919795**	133702	907352	**0.91**	8
2032	132	39	481	131	10	20	297034	**2216829**	140387	1047739	**1.05**	9
2033	**139**	**41**	**505**	**138**	**10**	**21**	**311886**	**2528715**	**147407**	**1195146**	**1.20**	**10**
2034	146	43	530	145	11	22	327480	**2856195**	154777	1349923	**1.35**	11
2035	153	46	557	152	12	23	343854	**3200050**	162516	1512439	**1.51**	12
2036	160	48	585	159	12	25	361047	**3561097**	170642	1683080	**1.68**	13
2037	168	50	614	167	13	26	379099	**3940196**	179174	1862254	**1.86**	14
2038	**177**	**53**	**645**	**176**	**13**	**27**	**398054**	**4338250**	**188132**	**2050386**	**2.05**	**15**
2039	186	55	677	185	14	28	417957	**4756207**	197539	2247925	**2.25**	16
2040	195	58	711	194	15	30	438855	**5195062**	207416	2455341	**2.46**	17
2041	205	61	746	204	15	31	460798	**5655859**	217787	2673127	**2.67**	18
2042	215	64	784	214	16	33	483837	**6139697**	228676	2901803	**2.90**	19
2043	**226**	**67**	**823**	**224**	**17**	**35**	**508029**	**6647726**	**240110**	**3141913**	**3.14**	**20**
2044	237	71	864	236	18	36	533431	**7181157**	252115	3394028	**3.39**	21
2045	249	74	907	247	19	38	560102	**7741259**	264721	3658749	**3.66**	22
2046	261	78	953	260	20	40	588107	**8329366**	277957	3936706	**3.94**	23
2047	274	82	1000	273	21	42	617513	**8946879**	291855	4228561	**4.23**	24
2048	**288**	**86**	**1050**	**286**	**22**	**44**	**648388**	**9595267**	**306448**	**4535009**	**4.54**	**25**
2049	303	90	1103	301	23	46	680808	**10276075**	321770	4856779	**4.86**	26
2050	318	95	1158	316	24	49	714848	**10990923**	337859	5194637	**5.19**	27
2051	334	99	1216	332	25	51	750591	**11741514**	354751	5549389	**5.55**	28
2052	350	104	1277	348	26	54	788120	**12529634**	372489	5921878	**5.92**	29
2053	**368**	**110**	**1340**	**365**	**28**	**56**	**827526**	**13357160**	**391113**	**6312991**	**6.31**	**30**

$$N = \frac{365 \times [(1 + r)^n - 1]}{r} \times A \times D \times F$$

N =	MSA		
r =	Traffic Growth Rate		
n =	Design Year		
D =	Lane Distribution Factor		
F =	VDF		
A =	No of Commercial Vehicles at the start of projection		

For 20 Year **N= 3.14 MSA**

For 30 Year **N= 6.31 MSA**

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Appendix-VI

Origin and Destination Survey for Passanger Vehicles (UP Direction)

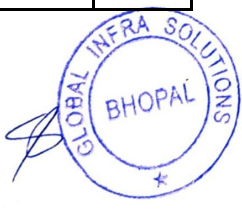
Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
1	CAR	NL 4 AU 8634	Cooch Behar	11	Cooch Behar	WB	Damra	1	Goalpara	AS	W	N	Personal	230
2	MINI BUS	AS 18 AC 4822	Dudhnoi	1	Goalpara	AS	Meghalaya	9	Meghalaya	ML	W	N	Bussiness	200
3	CAR	AS 18 64 85	Dudhnoi	1	Goalpara	AS	Nawre	6	East Garo Hills	ML	D	Y	Personal	88
4	CAR	AS 24 A 7352	Dudhnoi	1	Goalpara	AS	Market Damra	1	Goalpara	AS	W	N	Self	50
5	MINI BUS	AS 18 K 9752	Guwahati	4	Guwahati	AS	Meghalaya	9	Meghalaya	ML	D	Y	Bussiness	195
6	CAR	AS 24 A 1263	Dudhnoi	1	Goalpara	AS	Market Damra	1	Goalpara	AS	D	Y	Work	45
7	VAN	AS 18 AC 7622	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	W	N	Work	150
8	CAR	AS 18 BC 4961	Kamakhya	4	Kamrup	AS	Wageasi	6	East Garo Hills	ML	M	N	Work	220
9	CAR	AS 18 BC 1530	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Bussiness	35
10	CAR	AS 18 AC 7522	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Bussiness	45
11	MINI BUS	AS 18 BC 6536	Kamakhya Mandir	4	Kamrup	AS	Damra	1	Goalpara	AS	D	Y	Passenger	150
12	CAR	AS 18 A 6778	Guwahati	4	Guwahati	AS	Nokrek National Park	8	West Garo Hills	ML	W	N	Personal	200
13	VAN	AS 18 78 55	Goalpara	2	Goalpara	AS	Songsak	6	East Garo Hills	ML	D	Y	Personal	95
14	BUS	AS 10 16 65	Kamakhya Mandir	4	Kamrup	AS	Damra	1	Goalpara	AS	D	Y	Passenger	150
15	CAR	AS 1 Q 5846	Dhupdhara	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	D	Y	Personal	190
16	CAR	AS 18 L 5231	Nagaon	5	Nagaon	AS	Ranikor	8	East Khasi Hills	ML	Y	N	Work	215
17	JEEP	AS 18 K 8686	Guwahati	4	Guwahati	AS	Rongram	8	West Garo Hills	ML	W	N	Personal	186
18	CAR	AS 18 C 852	Bongaigaon	3	Bongaigaon	AS	Siju	9	South Garo Hills	ML	W	N	Personal	165
19	CAR	AS 18 D 3476	Hulukanda Hill	2	Goalpara	AS	Dachi Lake Resort, Anogre	7	West Garo Hills	ML	D	Y	Personal	70



Appendix-VI

Origin and Destination Survey for Passanger Vehicles (UP Direction)

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
20	MINI BUS	AS 10 B 1325	Dudhnoi College	1	Goalpara	AS	Williamnagar	6	East Garo Hills	ML	D	Y	Bussiness	125
21	CAR	AS 24 S 236	Agia	2	Goalpara	AS	Wageasi	6	East Garo Hills	ML	D	Y	Personal	80
22	CAR	AS 18 A 753	Guwahati	4	Guwahati	AS	Nokrek National Park	8	West Garo Hills	ML	M	N	Personal	200
23	MINI BUS	AS 1 Q 3423	Dudhnoi College	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Passenger	35
24	CAR	UP 22 BC 5954	Mornoi	2	Goalpara	AS	Ranikor	8	East Khasi Hills	ML	W	N	Work	235
25	CAR	AS 24 C 2566	Guwahati	4	Guwahati	AS	Rongram	8	West Garo Hills	ML	W	N	Bussiness	186
26	BUS	AS 18 AC 7526	Alipurduar	11	Jalpaiguri	WB	Shillong	8	East Khasi Hills	ML	W	N	Passenger	450
27	CAR	AS 24 C 8496	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	W	N	Personal	150
28	CAR	AS 18 H 5673	Tezpur	5	Sonitpur	AS	Rongrenggre Reserved Forest	6	East Garo Hills	ML	M	N	Personal	350
29	JEEP	AS 18 BC 1473	Mornoi	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	W	N	Work	195
30	CAR	AS 18 AC 3865	Goalpara	2	Goalpara	AS	Siju	9	South Garo Hills	ML	D	Y	Personal	90
31	CAR	AS 18 BC 6682	Jogighopa	3	Bongaigaon	AS	Dachi Lake Resort, Anogre	7	West Garo Hills	ML	D	Y	Bussiness	85
32	MINI BUS	AS 18 G 3364	Kamakhya Mandir	4	Kamrup	AS	Rongjeng	6	East Garo Hills	ML	W	N	Passenger	225
33	CAR	AS 18 K 6863	Dhupdhara	2	Goalpara	AS	Depa	6	East Garo Hills	ML	W	N	Personal	125
34	CAR	AS 18 BC 6862	Guwahati	4	Guwahati	AS	Nokrek National Park	8	West Garo Hills	ML	Y	N	Personal	200
35	JEEP	AS 18 G 5546	Boko	4	Kamrup	AS	Songsak	6	East Garo Hills	ML	D	Y	Bussiness	180
36	CAR	UP 16 G 7566	Bongaigaon	3	Bongaigaon	AS	Shallang	8	West Khasi Hills	ML	W	N	Work	150

Appendix-VI

Origin and Destination Survey for Passanger Vehicles (UP Direction)

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
37	VAN	AS 18 G 6524	Nagaon	5	Nagaon	AS	Damra	1	Goalpara	AS	W	N	Work	200
38	BUS	AS 18 N 9846	Manas National Park	3	Barpeta	AS	Nongstoin	8	West Khasi Hills	ML	W	N	Bussiness	250
39	CAR	AS 18 C 8562	Guwahati	4	Guwahati	AS	Williamnagar	6	East Garo Hills	ML	M	N	Personal	200
40	CAR	AS 24 C 2463	Goalpara	2	Goalpara	AS	Siju	9	South Garo Hills	ML	W	N	Personal	90
41	MINI BUS	AS 18 D 6452	Dudhnoi College	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Passenger	50
42	CAR	AS 18 R 8462	Buxa Wildlife Sanctuary	11	Jalpaiguri	WB	Wageasi	6	East Garo Hills	ML	W	N	Education	500
43	CAR	AS 18 G 8446	Guwahati	4	Guwahati	AS	Rongram	8	West Garo Hills	ML	W	N	Work	186
44	CAR	AS 18 BC 6358	Maa Kali Mandir Dudhnoi	1	Goalpara	AS	Shillong	8	East Khasi Hills	ML	M	N	Darshan	250
45	JEEP	AS 18 C 7965	Agia	2	Goalpara	AS	Ranikor	8	East Khasi Hills	ML	W	N	Work	240
46	CAR	AS 18 E 5263	Kamakhya Mandi	4	Kamrup	AS	Damra	1	Goalpara	AS	D	Y	Darshan	150
47	CAR	AS 18 G 4522	Nainital	12	Nainital	UK	Riat Phyllaw Waterfall	8	West Khasi Hills	ML	Y	N	Personal	1800
48	VAN	AS 18 C 7856	Dudhnoi College	1	Goalpara	AS	Rompa	2	Goalpara	AS	D	Y	Bussiness	35
49	CAR	UP 16 G 2364	Guwahati	4	Guwahati	AS	Tura	8	West Garo Hills	ML	D	Y	Work	180
50	BUS	AS 18 E 7522	Hulukanda Hill	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	M	N	Bussiness	200
51	CAR	AS 18 G 6527	Guwahati	4	Guwahati	AS	Nokrek National Park	8	West Garo Hills	ML	W	N	Personal	200
52	CAR	AS 18 F 6846	Dhupdhara	2	Goalpara	AS	Williamnagar	6	East Garo Hills	ML	W	N	Personal	125

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Origin and Destination Survey for Passanger Vehicles (UP Direction)

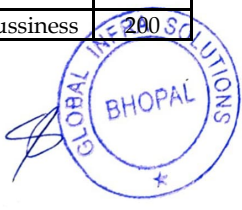
Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
53	CAR	AS 18 H 2436	Bongaigaon	3	Bongaigaon	AS	Siju	9	South Garo Hills	ML	D	Y	Personal	165
54	CAR	AS 18 G 17856	Bharbari	2	Goalpara	AS	Depa	6	East Garo Hills	ML	D	Y	Personal	100
55	JEEP	AS 18 BG 2846	Kamakhya Mandir	4	Kamrup	AS	Rongjeng	6	East Garo Hills	ML	M	N	Bussiness	225
56	CAR	AS 18 E 8622	Tezpur	5	Sonitpur	AS	Dachi Lake Resort, Anogre	7	West Garo Hills	ML	Y	N	Tourist	365
57	CAR	AS 18 B 8674	Guwahati	4	Guwahati	AS	Tura	8	West Garo Hills	ML	M	N	Bussiness	180
58	CAR	AS 18 E 2564	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	M	N	Bussiness	150
59	MINI BUS	AS 18 G 5634	Agia	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	D	Y	Bussiness	185
60	CAR	AS 24 A 7522	Manas National Park	3	Barpeta	AS	Tura	8	West Garo Hills	ML	M	N	Tourist	200
61	CAR	AS 18 CC 3426	Alipurduar	11	Jalpaiguri	WB	Silchar	5	Cachar	AS	W	N	Work	720
62	BUS	AS 18 E 8946	Mornoi	2	Goalpara	AS	Songsak	6	East Garo Hills	ML	D	Y	Bussiness	90
63	CAR	AS 18 G 6584	Jogighopa	3	Bongaigaon	AS	Damra	1	Goalpara	AS	W	N	Tourist	45
64	CAR	AS 24 A 2533	Nainital	12	Nainital	UK	Ranikor	8	East Khasi Hills	ML	M	N	Work	1850
65	CAR	AS 18 G 9856	Guwahati	4	Guwahati	AS	Tura	8	West Garo Hills	ML	M	N	Bussiness	180
66	CAR	AS 18 EA 4526	Tezpur	5	Sonitpur	AS	Wageasi	6	East Garo Hills	ML	M	N	Bussiness	350
67	CAR	AS 18 BC 6622	Agia	2	Goalpara	AS	Siju	9	South Garo Hills	ML	D	Y	Work	85
68	MINI BUS	AS 18 E 7563	Kamakhya Mandir	4	Kamrup	AS	Damra	1	Goalpara	AS	D	Y	Bussiness	150
69	CAR	AS 18 BC 7924	Statue Of Mahabir Chilarai	3	Bongaigaon	AS	Shillong	8	East Khasi Hills	ML	M	N	Personal	255
70	CAR	AS 18 H 5236	Guwahati	4	Guwahati	AS	Williamnagar	6	East Garo Hills	ML	Y	N	Bussiness	200



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Origin and Destination Survey for Passanger Vehicles (UP Direction)

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
71	JEEP	AS 18 AA 5625	Bongaigaon	3	Bongaigaon	AS	Dachi Lake Resort, Anogre	7	West Garo Hills	ML	D	Y	Tourist	80
72	VAN	AS 18 CC 7626	Boko	4	Kamrup	AS	Shallang	8	West Khasi Hills	ML	M	N	Tourist	150
73	CAR	AS 18 BC 7862	Alipurduar	11	Jalpaiguri	WB	Shillong	8	East Khasi Hills	ML	M	N	Personal	500
74	MINI BUS	AS 18 BQ 6346	Manas National Park	3	Barpeta	AS	Nongstoin	8	West Khasi Hills	ML	M	N	Bussiness	250
75	CAR	AS 18 A 2596	Agia	2	Goalpara	AS	Siju	9	South Garo Hills	ML	D	Y	Work	85
76	CAR	AS 18 AC 7463	Hulukanda Hill	2	Goalpara	AS	Damra	1	Goalpara	AS	W	N	Personal	45
77	CAR	UP 16 C 8433	Buxa Wildlife Sanctuary	11	Jalpaiguri	WB	Tura	8	West Garo Hills	ML	M	N	Work	250
78	BUS	AS 18 AC 8462	Guwahati	4	Guwahati	AS	Adugiri	7	West Garo Hills	ML	W	N	Bussiness	230
79	CAR	AS 10 E 5862	Bongaigaon	3	Bongaigaon	AS	Songsak	6	East Garo Hills	ML	D	Y	Personal	130
80	CAR	AS 18 H 7856	Guwahati	4	Guwahati	AS	Adugiri	7	West Garo Hills	ML	W	N	Bussiness	230
81	CAR	AS 18 B 6246	Mornoi	2	Goalpara	AS	Ranikor	8	East Khasi Hills	ML	Y	N	Work	235
82	CAR	AS 18 H 8463	Kamakhya Mandir	4	Kamrup	AS	Williamnagar	6	East Garo Hills	ML	W	N	Darshan	230
83	CAR	AS 18 AC 8655	Dhupdhara	2	Goalpara	AS	Williamnagar	6	East Garo Hills	ML	D	Y	Passenger	120
84	MINI BUS	AS 18 F 4526	Tezpur	5	Sonitpur	AS	Shallang	8	West Khasi Hills	ML	W	N	Work	330
85	CAR	AS 18 BC 7956	Hulukanda Hill	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	M	N	Self	200
86	VAN	AS 18 AC 2648	Dudhnoi College	1	Goalpara	AS	Rompa	2	Goalpara	AS	D	Y	Self	35
87	JEEP	AS 18 E 7625	Agia	2	Goalpara	AS	Siju	9	South Garo Hills	ML	D	Y	Bussiness	85

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Origin and Destination Survey for Passanger Vehicles (UP Direction)

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** Friday, November 23, 2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
88	CAR	AS 18 BC 8499	Nagaon	5	Nagaon	AS	Ranikor	8	East Khasi Hills	ML	Y	N	Bussiness	215
89	CAR	AS 24 GA 8462	Alipurduar	11	Jalpaiguri	WB	Silchar	5	Cachar	AS	M	N	Work	720
90	MINI BUS	AS 18 AC 2786	Mornoi	2	Goalpara	AS	Songsak	6	East Garo Hills	ML	D	Y	Work	110
91	CAR	AS 18 C 3588	Guwahati	4	Guwahati	AS	Tura	8	West Garo Hills	ML	M	N	Bussiness	180
92	CAR	AS 11 AC 8655	Kamakhya	4	Kamrup	AS	Damra	1	Goalpara	AS	M	N	Personal	150
93	VAN	AS 11 F 4526	Agia	2	Goalpara	AS	Shallang	8	West Khasi Hills	ML	M	N	Bussiness	175
94	CAR	AS 11 BC 7956	Bongaigaon	3	Bongaigaon	AS	Dachi Lake Resort,	7	West Garo Hills	ML	D	Y	Bussiness	80
95	CAR	AS 11 AC 2648	Kamakhya	4	Kamrup	AS	Williamnagar	6	East Garo Hills	ML	W	N	Personal	230
96	CAR	AS 11 E 7625	Hulukanda Hill	2	Goalpara	AS	Rongrenggre	6	East Garo Hills	ML	D	Y	Personal	105
97	MINI BUS	AS 11 BC 8499	Manas National	3	Barpeta	AS	Wageasi	6	East Garo Hills	ML	D	Y	Bussiness	135
98	CAR	AS 24 G 6584	Buxa Wildlife	11	Jalpaiguri	WB	Tura	8	West Garo Hills	ML	M	N	Personal	250
99	JEEP	UP 16 A 9348	Agia	2	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Bussiness	36
100	CAR	AS 11 AC 2786	Kamakhya	4	Kamrup	AS	Songsak	6	East Garo Hills	ML	M	N	Personal	180
101	VAN	AS 11 C 3588	Guwahati	4	Guwahati	AS	Williamnagar	6	East Garo Hills	ML	W	N	Bussiness	200

GLOBAL INFRA SOLUTIONS BHOPAL

Appendix-VI

Origin and Destination Survey for Passanger Vehicles

Package No.: NHIDCL/BHARATMALA/DPR/

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:**

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
1	CAR	ML 7 B 9308	Churaibari	5	Karimganj	AS	Guwahati	4	Guwahati	AS	W	N	Personal	315
2	CAR	ML 6 C 9223	Siju	9	South Garo Hills	ML	Khutera	11	Chatra	JH	M	N	Work	1050
3	MINI BUS	ML 5 BC 3033	Shillong	9	East Khasi Hill	ML	Dudhnoi	1	Goalpara	AS	W	N	Passenger	230
4	CAR	ML 6 BC 2039	Nongjri	9	West Khasi Hills	ML	Dudhnoi	1	Goalpara	AS	W	N	Personal	165
5	BUS	ML 7 B 5238	Williamnagar	6	East Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Passenger	120
6	CAR	AS 24 A 708	Jamshedpur	11	Jamshedpur	JH	Dudhnoi	1	Goalpara	AS	M	N	Bussiness	950
7	VAN	AS 18 E 8335	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Personal	35
8	CAR	AS 18 H 8308	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	25
9	MINI BUS	ML 6 AC 8888	Nongjri	9	West Khasi Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	165
10	CAR	AS 18 AC 7305	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	35
11	CAR	ML 5 A 3852	Shillong	9	East Khasi Hill	ML	Guwahati	4	Guwahati	AS	D	Y	Personal	95
12	CAR	AS 19 K 3298	Damra	1	Goalpara	AS	Jogighopa	3	Bongaigaon	AS	D	Y	Personal	45
13	BUS	ML 5 K 7225	Shallang	9	West Khasi Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Passenger	165
14	CAR	ML 7 L 9928	Williamnagar	6	East Garo Hills	ML	Manupara	1	Goalpara	AS	D	Y	Work	135
15	MINI BUS	ML 5 K 2833	Shillong	9	East Khasi Hill	ML	Goalpara	2	Goalpara	AS	M	N	Work	235
16	CAR	AS 11 K 3353	Ampati	7	uth West Garo H	ML	Ianas National Pa	3	Barpeta	AS	W	N	Tourists	250
17	CAR	AS 18 KS 9233	Rompa	2	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	20
18	CAR	ML 6 BC 2203	Jengjal	7	West Garo Hills	ML	Krishnai	2	Goalpara	AS	D	Y	Darshan	120
19	JEEP	AS 18 FC 3355	Depa	6	East Garo Hills	ML	Goalpara	2	Goalpara	AS	D	Y	Work	85
20	CAR	AS 11 BC 3854	Ampati	7	uth West Garo H	ML	Bilasipara	3	Dhubri	AS	D	Y	Personal	135
21	BUS	ML 8 KC 7585	Dainadubi	6	East Garo Hills	ML	Agia	2	Goalpara	AS	D	Y	Bussiness	90
22	CAR	WB 69 KS 3325	Shillong	9	East Khasi Hill	ML	Hasimara	11	Alipurduar	WB	W	N	Passenger	430
23	CAR	AS 18 KZ 7725	Damra	1	Goalpara	AS	Vigyan Kendra G	2	Goalpara	AS	D	Y	Education	35
24	MINI BUS	ML 8 TC 8309	Wageasi Market	6	East Garo Hills	ML	Abhayapuri	3	Bongaigaon	AS	D	Y	Work	125

Appendix-VI

Origin and Destination Survey for Passanger Vehicles

Package No.: NHIDCL/BHARATMALA/DPR/

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:**

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
25	CAR	UP 85 FC 2078	Siju	9	South Garo Hills	ML	Krishnai	2	Goalpara	AS	D	Y	Relative	105
26	CAR	ML 6 D 5783	Nekora	9	South Garo Hills	ML	Goalpara	2	Goalpara	AS	W	N	Work	90
27	MINI BUS	ML 8 BC 2053	Shallang	9	West Khasi Hills	ML	Chapar	3	Dhubri	AS	D	Y	Work	150
28	CAR	AS 11 CC 8085	Kolkata	11	Kolkata	WB	Tezpur	5	Sonitpur	AS	Y	N	Bussiness	1110
29	CAR	AS A 59 1 8	Ampati	7	uth West Garo H	ML	Agia	2	Goalpara	AS	M	N	Darshan	160
30	CAR	AS 18 BC 8878	Damra	1	Goalpara	AS	udhnoi High Scho	1	Goalpara	AS	D	Y	Education	45
31	VAN	ML 6 AC 5338	Jengjal	7	West Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Darshan	105
32	CAR	AS 18 H 7035	Depa	6	East Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Relative	95
33	CAR	ML 8 CC 5220	Meatha	9	South Garo Hills	ML	Agia	2	Goalpara	AS	D	Y	Work	85
34	CAR	UP 22 C 585	Damra	1	Goalpara	AS	Rangjuli	1	Goalpara	AS	D	Y	Bussiness	35
35	CAR	AS 11 RC 7350	Tamilnadu	12	Tamilnadu	TN	Guwahati	4	Guwahati	AS	W	N	Work	3000
36	MINI BUS	ML 5 76 28	Shillong	9	East Khasi Hill	ML	Krishnai	2	Goalpara	AS	W	N	Personal	240
37	CAR	ML 7 AC 7088	Williamnagar	6	East Garo Hills	ML	Dhupdhara	2	Goalpara	AS	D	Y	Personal	120
38	MINI BUS	AS 18 AA 8282	Market Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	60
39	MINI BUS	ML 8 PC 8370	Williamnagar	6	East Garo Hills	ML	Manupara	1	Goalpara	AS	D	Y	Personal	115
40	CAR	AS 18 F 3578	Damra	1	Goalpara	AS	Krishi Vigyan Kendra Goalpara	2	Goalpara	AS	D	Y	Education	35
41	JEEP	ML 7 C 2088	Williamnagar	6	East Garo Hills	ML	Chikni	3	Barpeta	AS	D	Y	Work	150
42	BUS	ML 9 PB 8395	Siju	9	South Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Personal	80
43	CAR	ML 5 CC 2983	Shillong	9	East Khasi Hill	ML	Madhya Madariha	11	Alipurduar	WB	M	N	Personal	430
44	CAR	AS 18 AC 2798	Depa	6	East Garo Hills	ML	Dudhnoi	1	Goalpara	AS	W	N	Personal	95
45	MINI BUS	ML 4 AC 893	Shallang	9	West Khasi Hills	ML	Agia	2	Goalpara	AS	W	N	Work	195

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Origin and Destination Survey for Passanger Vehicles

Package No.: NHIDCL/BHARATMALA/DPR/

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:**

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
46	CAR	UP 27 AC 722	Balpakram National Park	9	South Garo Hills	ML	Guwahati	4	Guwahati	AS	D	Y	Family	180
47	VAN	ML 6 FC 928	Jengjal	7	West Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Tourists	105
48	CAR	AS 18 AC 7092	Damra	1	Goalpara	AS	Rangjuli	1	Goalpara	AS	D	Y	Bussiness	30
49	CAR	AS 11 K 9353	Kolkata	11	Kolkata	WB	Jorhat	5	Jorhat	AS	Y	N	Bussiness	1300
50	CAR	ML 8 K 9258	Williamnagar	6	East Garo Hills	ML	Dhupdhara	2	Goalpara	AS	D	Y	Passenger	125
51	CAR	AS 24 A 382	Damra	1	Goalpara	AS	Dhupdhara	2	Goalpara	AS	W	N	Bussiness	35
52	MINI BUS	ML 8 F 8552	Wageasi	6	East Garo Hills	ML	Abhayapuri	3	Bongaigaon	AS	D	Y	Work	125
53	CAR	ML 8 FC 9323	Meatha	9	South Garo Hills	ML	Krishnai	2	Goalpara	AS	D	Y	Bussiness	105
54	VAN	ML 08 BC 2822	Jowai	9	Jaintia Hills	ML	Goalpara	2	Goalpara	AS	W	N	Personal	300
55	CAR	AS 11 BC 2722	Tamilnadu	12	Tamilnadu	TN	Guwahati	4	Guwahati	AS	Y	N	Work	3000
56	CAR	ML 5 Z 2720	Jengjal	7	West Garo Hills	ML	Chapar	3	Dhubri	AS	D	Y	Personal	135
57	CAR	AS 16 BC 8709	Damra	1	Goalpara	AS	Krishi Vigyan Kendra Goalpara	2	Goalpara	AS	D	Y	Personal	45
58	MINI BUS	ML 5 F 2898	Chokpot	9	South Garo Hills	ML	Bilasipara	3	Dhubri	AS	W	N	Bussiness	250
59	CAR	WB 69 AC 8773	Shillong	9	East Khasi Hill	ML	Hasimara	11	Alipurduar	WB	M	N	Work	430
60	CAR	ML 6 94 75	Balpakram National Park	9	South Garo Hills	ML	Dispur	4	Guwahati	AS	D	Y	Passenger	220
61	CAR	ML 8 12 52	Meatha	9	South Garo Hills	ML	Dudhnoi	1	Goalpara	AS	Y	N	Self	80
62	CAR	ML 7 Q 3322	Williamnagar	6	East Garo Hills	ML	Dhupdhara	2	Goalpara	AS	D	Y	Personal	120
63	CAR	ML 8 12 5298	Siju	9	South Garo Hills	ML	Bilasipara	3	Dhubri	AS	W	N	Work	250
64	MINI BUS	ML 8 AP 8898	Dainadubi	6	East Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	85
65	CAR	NL 07 B 7225	Kolkata	11	Kolkata	WB	Dimapur	10	Dimapur	NL	M	N	Bussiness	1000

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Origin and Destination Survey for Passanger Vehicles

Package No.: NHIDCL/BHARATMALA/DPR/

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:**

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
66	CAR	UP 32 C 355	Williamnagar	6	East Garo Hills	ML	Boko	4	Kamrup	AS	W	N	Relative	230
67	VAN	AS 10 BC 220	Jowai	9	Jaintia Hills	ML	Goalpara	2	Goalpara	AS	W	N	Work	300
68	BUS	AS 12 B 2333	Shallang	9	West Khasi Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	165
69	CAR	ML 5 E 5572	Siju	9	South Garo Hills	ML	Dudhnoi	1	Goalpara	AS	M	N	Darshan	80
70	MINI BUS	ML 5 B 3307	Shillong	9	East Khasi Hill	ML	Krishnai	2	Goalpara	AS	M	N	Bussiness	240
71	CAR	AS 19 C 3523	Damra	1	Goalpara	AS	Jogighopa	3	Bongaigaon	AS	D	Y	Work	45
72	CAR	ML 4 Q 7250	Odisha	12	Odisha	OR	Guwahati	4	Guwahati	AS	W	N	Work	1300
73	CAR	ML 8 C 3238	Williamnagar	6	East Garo Hills	ML	Mornoi	1	Goalpara	AS	D	Y	Work	125
74	MINI BUS	AS 7 A 325	Williamnagar	6	East Garo Hills	ML	Mornoi	1	Goalpara	AS	D	Y	Bussiness	122
75	CAR	NE W	Balpakram National Park	9	South Garo Hills	ML	Nalbari	5	Nalbari	AS	Y	N	Work	225
76	CAR	AS 19 A 934	Siju	9	South Garo Hills	ML	Abhayapuri	3	Bongaigaon	AS	M	N	Work	185
77	CAR	AS 24 C 5222	Meatha	9	South Garo Hills	ML	Dudhnoi	1	Goalpara	AS	W	N	Darshan	80
78	MINI BUS	AS 29 A 6084	Siju	9	South Garo Hills	ML	Goalpara	2	Goalpara	AS	D	Y	Work	90
79	CAR	AS 11 BC 1875	Odisha	12	Odisha	OR	Guwahati	4	Guwahati	AS	W	N	Bussiness	1300
80	VAN	AS 8 FC 9068	Williamnagar	6	East Garo Hills	ML	Dhupdhara	2	Goalpara	AS	W	N	Work	120
81	CAR	UP 32 SA 9357	Shillong	9	East Khasi Hill	ML	Dudhnoi	1	Goalpara	AS	M	N	Bussiness	230
82	JEEP	AS 11 BC 5820	Damra	1	Goalpara	AS	udhnoi High Scho	1	Goalpara	AS	D	Y	Education	30
83	CAR	AS 12 AX 5842	Jowai	9	Jaintia Hills	ML	Krishnai	2	Goalpara	AS	M	N	Personal	315
84	BUS	AS 9 BC 4694	Dainadubi	6	East Garo Hills	ML	Dudhnoi	1	Goalpara	AS	D	Y	Bussiness	90
85	VAN	AS 8 J 7580	Williamnagar	6	East Garo Hills	ML	Boko	4	Kamrup	AS	Y	N	Bussiness	230
86	CAR	AS 11 B 9225	Damra	1	Goalpara	AS	Dhupdhara	2	Goalpara	AS	D	Y	Personal	35
87	MINI BUS	ML 7 B 6425	Williamnagar	6	East Garo Hills	ML	Dhupdhara	2	Goalpara	AS	D	Y	Work	120
88	CAR	ML 4 94 6	Siju	9	South Garo Hills	ML	anas National Pa	3	Barpeta	AS	W	N	Tourists	240

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Origin and Destination Survey for Passanger Vehicles

Package No.: NHIDCL/BHARATMALA/DPR/

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:**

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Trip purpose	Trip (Km)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State				
89	MINI BUS	AS 11 NV 3319	Shallang	9	West Khasi Hills	ML	Goalpara	2	Goalpara	AS	D	Y	Personal	185
90	CAR	AS 18 FC 3198	Meatha	9	South Garo Hills	ML	Krishnai	2	Goalpara	AS	D	Y	Relative	105

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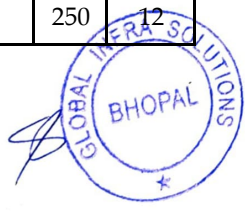
Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity Type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
1	2XL	ML 08 BC 2696	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	W	N	Equpments	150	12
2	LCV	AS 14 FC 5672	Dudhnoi	1	Goalpara	AS	Mizoram	10	Mizoram	MZ	M	N	Sugar	700	4
3	LCV	AS 18 B 9131	Barpeta	3	Barpeta	AS	Damra	1	Goalpara	AS	D	Y	Gas Cylender	130	2
4	2XL	AS 20 KC 7969	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Empty	35	0
5	LCV	AS 14 CC 5459	Paltan Bazaar	4	Guwahati	AS	Market Damra	1	Goalpara	AS	W	N	Khad	155	2
6	LCV	AS 18 FC 2299	Dudhnoi	1	Goalpara	AS	Rongjeng	6	East Garo Hills	ML	D	Y	Transformer	100	3
7	2XL	ML 05 FC 9222	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	W	N	Gas Cylender	50	10
8	MXL	AS 24 G 1418	Bongaigaon	3	Bongaigaon	AS	Rongjeng	6	East Garo Hills	ML	D	Y	Kabada	130	38
9	LCV	AS 14 CA 5648	Jogighopa	3	Bongaigaon	AS	Wageasi	6	East Garo Hills	ML	W	N	Furniture	135	2
10	LCV	AS 18 KS 1249	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Fruits	50	2
11	2XL	AS 20 A 6248	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	W	N	Empty	150	0
12	LCV	AS 12 FC 7626	Guwahati	4	Guwahati	AS	Rangram	11	Singhbhum	JH	W	N	Kabada	1120	1
13	LCV	AS 18 K 9498	Dudhnoi	1	Goalpara	AS	Damra	1	Goalpara	AS	D	Y	Cement	35	1
14	2XL	AS 11 BC 5468	Abhayapuri	3	Bongaigaon	AS	Hailakandi	5	Hailakandi	AS	M	N	Gas Cylender	450	10
15	LCV	ML 7 UU 7067	Guwahati	4	Guwahati	AS	Williamnagar	6	East Garo Hills	ML	M	N	Sand	205	1.5
16	LCV	AS 24 AM 2824	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	M	N	Machine	150	2
17	MXL	UP 93 C 5782	Dudhnoi	1	Goalpara	AS	Market Damra	1	Goalpara	AS	D	Y	Petrol	35	40
18	2XL	ML 8 N 9604	Nalbari	5	Nalbari	AS	Resubelpara	6	East Garo Hills	ML	W	N	Oil Tanker	250	12



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Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity Type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
19	LCV	AS 12 AC 7565	Abhayapuri	3	Bongaigaon	AS	Damra	1	Goalpara	AS	D	Y	Gas Cylinder	55	3
20	LCV	AS 21 BC 1879	Guwahati	4	Guwahati	AS	Rangram	11	Singhbhum	JH	Y	N	Empty	1120	0
21	2XL	ML 6 DC 2505	Paltan Bazaar	4	Guwahati	AS	Silchar	5	Cachar	AS	W	N	Oil Tanker	330	12
22	LCV	AS 12 NC 7688	Bongaigaon	3	Bongaigaon	AS	Silchar	5	Cachar	AS	W	N	Parcel	500	2
23	LCV	ML 8 FC 9224	Dudhnoi College	1	Goalpara	AS	Govt. Higher Sc	1	Goalpara	AS	W	N	Furniture	45	3
24	2XL	AS 11 C 3155	Guwahati	4	Guwahati	AS	Ranikor	8	East Khasi Hills	ML	D	Y	Empty	135	0
25	MXL	AS 24 N 1907	Barpeta	3	Barpeta	AS	Shillong	8	East Khasi Hills	ML	W	N	Bricks	180	32
26	LCV	AS 12 CC 2088	Goalpara	1	Goalpara	AS	Market Damra	1	Goalpara	AS	D	Y	Empty	50	0
27	LCV	ML 6 FC 8066	Paltan Bazaar	4	Guwahati	AS	Hailakandi	5	Hailakandi	AS	W	N	Empty	300	0
28	2XL	AS 24 C 5282	Jogighopa	3	Bongaigaon	AS	Damra	1	Goalpara	AS	W	N	Furniture	45	10
29	LCV	ML 5 FB 8139	Jogighopa	3	Bongaigaon	AS	Shillong	8	East Khasi Hills	ML	W	N	Empty	250	0
30	LCV	ML 8 FB 2099	Bongaigaon	3	Bongaigaon	AS	Shallang	8	West Khasi Hills	ML	M	N	Wood	150	2
31	2XL	ML 7 H 5153	Dudhnoi	1	Goalpara	AS	Mizoram	10	Mizoram	MZ	Y	N	Groceries	700	10
32	LCV	AS 19 MC 3418	Barpeta	3	Barpeta	AS	Market Damra	1	Goalpara	AS	W	N	Paper Roll	132	1
33	LCV	AS 30 CC 6056	Abhayapuri	3	Bongaigaon	AS	Resubelpara	6	East Garo Hills	ML	D	Y	Animal Food	125	3
34	MXL	UP 85 MN 9160	Guwahati	4	Guwahati	AS	Kolkata	11	Kolkata	WB	M	N	Iron	1020	40
35	2XL	AS 24 BC 6355	Paltan Bazaar	4	Guwahati	AS	Wageasi	6	East Garo Hills	ML	M	N	Petrol Tanker	195	12
36	LCV	AS 12 G 6257	Nalbari	5	Nalbari	AS	Shallang	8	West Khasi Hills	ML	M	N	Mixture Machine	350	1.5

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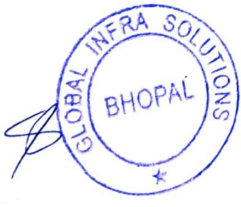
Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Dudhnoi-Damra -Dainadubi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity Type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
37	LCV	ML 9 A 5918	Guwahati	4	Guwahati	AS	Songsak	6	East Garo Hills	ML	D	Y	Cement	205	2
38	2XL	ML 05 E 8972	Barpeta	3	Barpeta	AS	Shallang	8	West Khasi Hills	ML	W	N	Bricks	230	9
39	LCV	AS 30 NV 4313	Guwahati	4	Guwahati	AS	Rongjeng	6	East Garo Hills	ML	W	N	Bamboo	200	1.5
40	2XL	ML 05 AC 6505	Jogighopa	3	Bongaigaon	AS	Shillong	8	East Khasi Hills	ML	M	N	Fruits	250	12
41	MXL	AS 24 A 6530	Nalbari	5	Nalbari	AS	Mizoram	10	Mizoram	MZ	W	N	Oil Tank	650	34
42	LCV	AS 19 FC 6677	Paltan Bazaar	4	Guwahati	AS	Shillong	8	East Khasi Hills	ML	D	Y	Gas Cylender	90	1.5
43	3XL	AS 18 F 6994	Guwahati	4	Guwahati	AS	Damra	1	Goalpara	AS	W	N	Wheat	150	18
44	LCV	AS 30 AC 5339	Goalpara	1	Goalpara	AS	Silchar	5	Cachar	AS	M	N	Empty	450	0
45	3XL	ML 8 GC 7066	Guwahati	4	Guwahati	AS	Sahibganj	11	Sahibganj	JH	M	N	Petrol	750	20
46	LCV	AS 30 H 7310	Dudhnoi College	1	Goalpara	AS	Govt. Higher Se	1	Goalpara	AS	D	Y	Furniture	50	2
47	3XL	AS 24 N 2787	Nalbari	5	Nalbari	AS	Silchar	5	Cachar	AS	W	N	Iron	385	15



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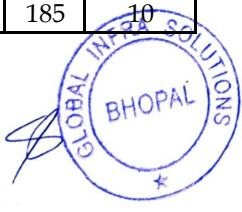
Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
1	2XL	ML 4 H 6940	Churaibari	5	Karimganj	AS	Guwahati	4	Guwahati	AS	Y	N	Auto Parts	315	10
2	LCV	AS 24 C 6228	Agartala	10	Agartala	TR	Dhupdhara	2	Goalpara	AS	Y	N	Cement	650	2
3	LCV	NL 1 A 3781	Damra	1	Goalpara	AS	Dudhoni	1	Goalpara	AS	D	Y	Cloths Bundell	45	2
4	2XL	MZ 2 3 2763	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Empty	50	0
5	LCV	ML 5 BC 1875	Churaibari	5	Karimganj	AS	Guwahati	4	Guwahati	AS	W	N	Machine	315	1
6	LCV	AS 24 25 2186	Damra	1	Goalpara	AS	Goalpara	2	Goalpara	AS	W	N	Fertilizer Bags	40	1.2
7	2XL	ML 4 T 4738	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	W	N	Bricks	50	12
8	LCV	ML 5 BC 3352	Shillong	8	East Khasi Hill	ML	Dudhnoi	1	Goalpara	AS	W	N	Kabada	230	2
9	2XL	ML 5 E 5072	Damra	1	Goalpara	AS	Dudhnoi	1	Goalpara	AS	D	Y	Cement	55	8
10	LCV	AS 18 BC 4816	Tura	7	West Garo Hills	ML	Agia	2	Goalpara	AS	D	Y	Chair	150	1.5
11	LCV	ML 6 AC 3967	Shillong	8	East Khasi Hill	ML	Dudhnoi	1	Goalpara	AS	W	N	Parcel	230	2
12	2XL	AS 11 BQ 2141	Rongram	7	West Garo Hills	ML	Darjeeling	11	Darjeeling	WB	M	N	Bricks	460	9
13	LCV	ML 5 CC 5444	Churaibari	5	Karimganj	AS	Guwahati	4	Guwahati	AS	W	N	Groceries	315	2
14	LCV	AS 18 C 1870	Mizoram	10	Mizoram	MZ	Nalbari	5	Nalbari	AS	W	N	Empty	650	0
15	MXL	UP 78 E 8115	Tripura	10	Tripura	TR	Dhubri	3	Dhubri	AS	M	N	Empty	720	0
16	2XL	NL 1 NC 5868	shillong	8	East Khasi Hill	ML	Guwahati	4	Guwahati	AS	D	Y	Iron rod	95	12
17	LCV	ML 1 AA 3181	Silchar	5	Cachar	AS	Barpeta	3	Barpeta	AS	Y	N	Gitti	400	1.5
18	2XL	ML 4 C 8879	Nairang	8	West Khasi Hills	ML	Goalpara	2	Goalpara	AS	D	Y	Gitti	185	10



Appendix-VI

Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
19	LCV	AS 24 C 9299	Rompa	1	Goalpara	AS	Bongaigaon	3	Bongaigaon	AS	D	Y	Oil Tanker	50	2
20	LCV	ML 6 BC 8014	Williamnagar	6	East Garo Hills	ML	Agia	2	Goalpara	AS	D	Y	Empty	120	0
21	2XL	MZ 5 A 1334	siju	10	South Garo Hills	ML	Boko	4	Kamrup	AS	D	Y	Iron	120	12
22	LCV	ML 8 BC 4644	Mizoram	10	Mizoram	MZ	Goalpara	2	Goalpara	AS	M	N	Cement	732	1
23	LCV	AS 18 BC 5866	Silchar	5	Cachar	AS	Dhupdhara	2	Goalpara	AS	W	N	Plastic Pipe	435	2
24	2XL	AS 18 A 4772	shillong	8	East Khasi Hill	ML	Dhubri	2	Dhubri	AS	Y	N	Kabada	350	12
25	LCV	ML 6 CC 6246	Rongram	7	West Garo Hills	ML	Dhubri	2	Dhubri	AS	D	Y	Empty	140	0
26	2XL	AS 11 D 5228	Tura	7	West Garo Hills	ML	Gohpur	5	Biswanath	AS	M	N	Iron Pole	500	10
27	LCV	ML 8 EE 2545	Damra market	1	Goalpara	AS	Krishnai	2	Goalpara	AS	D	Y	Cement	50	2
28	MXL	ML 6 BC 5651	Agartala	10	Agartala	TR	Guwahati	4	Guwahati	AS	W	N	Medicine	500	32
29	2XL	AS 11 CC 6647	Agartala	10	Agartala	TR	Goalpara	2	Goalpara	AS	W	N	Sand	660	10
30	LCV	ML 9 H 7195	Chokpot	10	South Garo Hills	ML	Bongaigaon	2	Bongaigaon	AS	W	N	Wood	165	2
31	2XL	ML 6 C 5013	Rompa	1	Goalpara	AS	Guwahati	4	Guwahati	AS	W	N	Cartoon Box	150	8
32	LCV	ML 5 G 3661	shillong	8	East Khasi Hill	ML	Barpeta	2	Barpeta	AS	D	Y	Gas Cylinder	180	1
33	2XL	ML 8 B 9306	Tripura	10	Tripura	TR	Bongaigaon	3	Bongaigaon	AS	W	N	Medicine	650	9
34	LCV	AS 03PC 5136	Nairang	8	West Khasi Hills	ML	Agia	2	Goalpara	AS	D	Y	Sand	190	1.5
35	2XL	ML 6 R 1253	Mizoram	10	Mizoram	MZ	Dari Duri	2	Goalpara	AS	M	N	Empty	750	0
36	LCV	AS 8 BC 7199	Tura	7	West Garo Hills	ML	Goalpara	2	Goalpara	AS	W	N	Water Tank	135	2
37	2XL	ML 8 1 9086	Rongram	7	West Garo Hills	ML	Goalpara	2	Goalpara	AS	D	Y	Plywood	135	12
38	LCV	AS 6 AA 8047	Chokpot	10	South Garo Hills	ML	Nalbari	5	Nalbari	AS	W	N	Caret Box	320	1.5
39	MXL	MZ 4 C 5375	Mizoram	10	Mizoram	MZ	Sikkim	11	Sikkim	SK	Y	N	Iron Road	1150	38

Appendix-VI

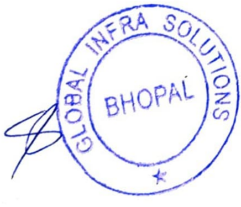
Origin and Destination Survey for Goods Vehicles

Road Section : Dudhnoi-Damra (5.00 Km)

Location: At km 3+500 (Near Damra A.S.A. Play Ground) **Date:** 11/23/2018

Direction : Damra-Dudhnoi

Sr. No.	Vehicle Type	Vehicle Reg. No.	Origin				Destination				Trip Frequency	Round Trip in the same	Commodity type	Trip (Km)	Weight (T)
			Village/ Town	Zone	District	State	Village/ Town	Zone	District	State					
40	2XL	ML 9 H 6176	Tripura	10	Tripura	TR	Dhubri	3	Dhubri	AS	W	N	Paper Roll	720	10
41	LCV	AS 10 N 9693	Damra market	1	Goalpara	AS	Dhupdhara	2	Goalpara	AS	D	Y	Chicken	35	2.5
42	2XL	ML 10 A 4250	siju	10	South Garo Hills	ML	Nalbari	5	Nalbari	AS	Y	N	Chemical Tanke	320	10
43	LCV	WB 6 D 5906	Shallang	8	West Khasi Hills	ML	Bongaigaon	2	Bongaigaon	AS	D	Y	Fertilizer Bags	150	2
44	2XL	ML 12 G 1324	Agartala	10	Agartala	TR	Guwahati	4	Guwahati	AS	W	N	Parcel	500	12
45	LCV	NE 4 8922	Rongram	7	West Garo Hills	ML	Dhubri	2	Dhubri	AS	W	N	Branch	140	2
46	2XL	ML 8 CD 7889	Silchar	5	Cachar	AS	Goalpara	2	Goalpara	AS	M	N	Empty	450	0
47	LCV	AS 24 C 3012	shillong	8	East Khasi Hill	ML	Gohpur	5	Biswanath	AS	W	N	Paddy	350	1.5
48	3XL	UP 70 BC 1754	Damra	1	Goalpara	AS	Guwahati	4	Guwahati	AS	D	Y	Cement Pole	150	20
49	LCV	AS 6 C 9035	Williamnagar	6	East Garo Hills	ML	Dari Duri	2	Goalpara	AS	D	Y	Rice	125	2
50	3XL	ML 9 C 8078	Chokpot	10	South Garo Hills	ML	Bongaigaon	2	Bongaigaon	AS	W	N	Plastic Bags	165	18



Traffic Flow

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Section : Dudhnoi-Damra (5.00 Km)
Location: At km 3+500 (Near Damra A.S.A. Play Ground)
Direction : Dudhnoi-Damra -Dainadubi

		Data	
State	District	Count of District	Percentage of District
Assam	Barpeta	13	2.26%
	Biswanath	2	0.35%
	Bongaigaon	29	5.03%
	Cachar	9	1.56%
	Dhubri	10	1.74%
	Goalpara	195	33.85%
	Guwahati	53	9.20%
	Hailakandi	2	0.35%
	Jorhat	1	0.17%
	Kamrup	16	2.78%
	Karimganj	4	0.69%
	Nagaon	3	0.52%
	Nalbari	8	1.39%
	Sonitpur	5	0.87%
Assam Total		**350**	**60.76%**
Jharkahand	Chatra	1	0.17%
	Jamshedpur	1	0.17%
	Sahibganj	1	0.17%
	Singhbhum	2	0.35%
Jharkahand Total		**5**	**0.87%**
Meghalaya	East Garo Hills	58	10.07%
	East Khasi Hill	15	2.60%
	East Khasi Hills	15	2.60%
	Jaintia Hills	3	0.52%
	Meghalaya	2	0.35%
	South Garo Hills	30	5.21%
	South West Garo Hills	3	0.52%
	West Garo Hills	32	5.56%
	West Khasi Hills	25	4.34%
Meghalaya Total		**183**	**31.77%**
Mizoram	Mizoram	7	1.22%
Mizoram Total		**7**	**1.22%**
Nagaland	Dimapur	1	0.17%
Nagaland Total		**1**	**0.17%**
Odhisa	Odisha	2	0.35%
Odhisa Total		**2**	**0.35%**
Sikkim	Sikkim	1	0.17%
Sikkim Total		**1**	**0.17%**
Tamilnadu	Tamilnadu	2	0.35%
Tamilnadu Total		**2**	**0.35%**
Tripura	Agartala	4	0.69%

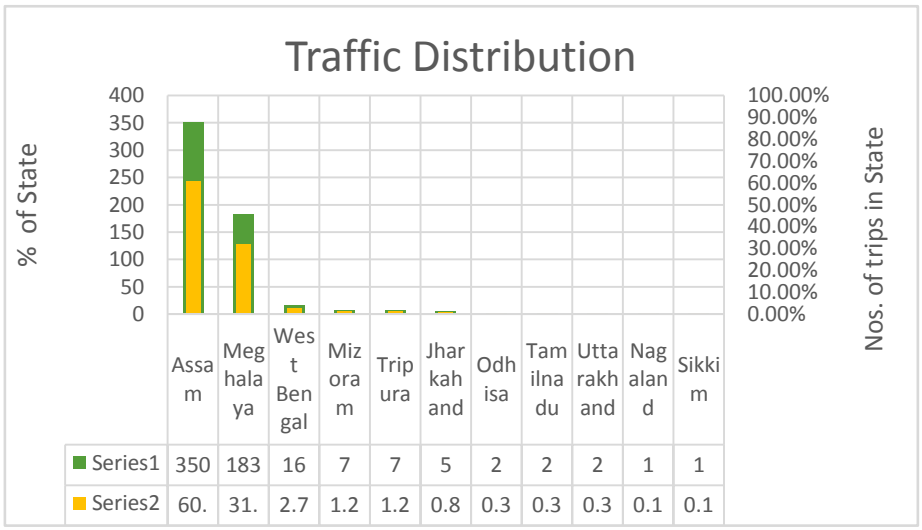
GLOBAL INFRA SOLUTIONS BHOPAL

Tripura	Tripura	3	0.52%
Tripura Total		**7**	**1.22%**
Uttarakhand	Nainital	2	0.35%
Uttarakhand Total		**2**	**0.35%**
West Bengal	Alipurduar	3	0.52%
	Cooch Behar	1	0.17%
	Darjeeling	1	0.17%
	Jalpaiguri	7	1.22%
	Kolkata	4	0.69%
West Bengal Total		**16**	**2.78%**
Grand Total		**576**	**100.00%**

Appendix-VI

Trafffic Distribution Statewise

Sr No.	State	Count of State	% of State
1	Assam	350	60.76%
2	Meghalaya	183	31.77%
3	West Bengal	16	2.78%
4	Mizoram	7	1.22%
5	Tripura	7	1.22%
6	Jharkahand	5	0.87%
7	Odhisa	2	0.35%
8	Tamilnadu	2	0.35%
9	Uttarakhand	2	0.35%
10	Nagaland	1	0.17%
11	Sikkim	1	0.17%
12	**Grand Total**	**576**	**100.00%**



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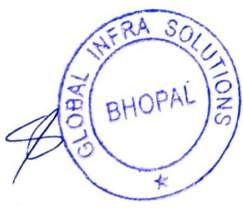
Appendix-VI

Zoning of Orizin-Destination (OD) Survey

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018
Road Section : Dudhnoi-Damra (5.00 Km)
Location: At km 3+500 (Near Damra A.S.A. Play Ground)
Direction : Dudhnoi-Damra -Dainadubi

Zone No.	Zone Description	Zone Type	Remarks
1	Local within 5-8km from survey location (Dudhnoi, Damra,Manupara etc.)	Internal	Local
2	Rest of Golpara District (Assam)	Internal	City/Town level
3	Barpeta, Bogaigaon, Dubri (Assam)	External	District Level
4	Guwahati District & Kamrup District (Assam)	External	District Level
5	Rest of Assam	External	State Level
6	North Garo Hills & East Garo Hills (Meghalaya)	External	District Level
7	South West Garo Hills & West Garo Hills (Meghalaya)	External	District Level
8	East Khasi Hill & West Khasi Hill (Meghalaya)	External	District Level
9	Rest of Meghalaya	External	State Level
10	Mizoram, Nagaland, Tripura State	External	State Level
11	West Bengal,Jharkhand & Sikkim	External	State Level
12	Rest of India	External	State Level



TRIP MATRIX FOR Passenger and Goods vehicles

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018
Road Section : Dudhnoi-Damra (5.00 Km)
Location: At 3+200km (Near Damra A.S.A. Play Ground)
Direction : Dudhnoi-Damra

TRIP MATRIX FOR PASSENGER VEHICLES

ORIZIN ZONES	DESTINATION ZONES												TOTAL
O/D	1	2	3	4	5	6	7	8	9	10	11	12	
1	14	7	2	0	0	2	0	1	1	0	0	0	27
2	3	0	0	0	0	9	1	9	5	0	0	0	27
3	1	0	0	0	0	2	3	5	2	0	0	0	13
4	8	0	0	0	0	10	2	12	1	0	0	0	33
5	1	0	0	1	0	2	1	3	0	0	0	0	8
6	9	7	3	2	0	0	0	0	0	0	0	0	21
7	2	2	3	0	0	0	0	0	0	0	0	0	7
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	10	14	5	3	1	0	0	0	0	0	4	0	37
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	2	0	0	0	4	1	0	4	0	1	0	0	12
12	0	0	0	4	0	0	0	2	0	0	0	0	6
TOTAL	50	30	13	10	5	26	7	36	9	1	4	0	191

TRIP MATRIX FOR GOODS VEHICLES

ORIZIN ZONES	DESTINATION ZONES												TOTAL
O/D	1	2	3	4	5	6	7	8	9	10	11	12	
1	12	3	1	2	1	1	0	0	0	2	0	0	22
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	4	0	0	0	2	3	0	5	0	0	0	0	14
4	5	0	0	0	2	4	0	2	0	0	4	0	17
5	0	2	1	3	1	1	0	1	0	1	0	0	10
6	0	2	0	0	0	0	0	0	0	0	0	0	2
7	0	5	0	0	1	0	0	0	0	0	1	0	7
8	2	5	0	1	1	0	0	0	0	0	0	0	9
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	6	3	3	3	0	0	0	0	0	1	0	16
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	23	23	5	9	11	9	0	8	0	3	6	0	97

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Zone Influnce factor

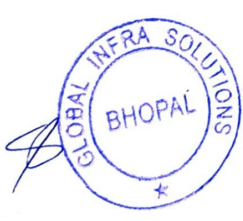
Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018
Road Section : Dudhnoi-Damra (5.00 Km)
Location: At km 3+500 (Near Damra A.S.A. Play Ground)
Direction : Dudhnoi-Damra -Dainadubi

Zone Influence Factor of Passenger Vehicles

Zone No.	Zone Description	Trip Production	Trip Attraction	ZIF (%)
1	Local within 5-8km from survey location (Dudhnoi, Damra,Manupara etc.)	27	50	20.16
2	Rest of Golpara District (Assam)	27	30	14.92
3	Barpeta, Bogaigaon, Dubri (Assam)	13	13	6.81
4	Guwahati District & Kamrup District (Assam)	33	10	11.26
5	Rest of Assam	8	5	3.40
6	North Garo Hills & East Garo Hills (Meghalaya)	21	26	12.30
7	South West Garo Hills & West Garo Hills (Meghalaya)	7	7	3.66
8	East Khasi Hill & West Khasi Hill (Meghalaya)	0	36	9.42
9	Rest of Meghalaya	37	9	12.04
10	Mizoram, Nagaland, Tripura State	0	1	0.26
11	West Bengal,Jharkhand & Sikkim	12	4	4.19
12	Rest of India	6	0	1.57
Total		**191**	**191**	**100**

Zone Influence Factor of Goods Vehicles

Zone No.	Zone Description	Trip Production	Trip Attraction	ZIF (%)
1	Local within 5-8km from survey location (Dudhnoi, Damra,Manupara etc.)	22	23	23.20
2	Rest of Golpara District (Assam)	0	23	11.86
3	Barpeta, Bogaigaon, Dubri (Assam)	14	5	9.79
4	Guwahati District & Kamrup District (Assam)	17	9	13.40
5	Rest of Assam	10	11	10.82
6	North Garo Hills & East Garo Hills (Meghalaya)	2	9	5.67
7	South West Garo Hills & West Garo Hills (Meghalaya)	7	0	3.61
8	East Khasi Hill & West Khasi Hill (Meghalaya)	9	8	8.76
9	Rest of Meghalaya	0	0	0.00
10	Mizoram, Nagaland, Tripura State	16	3	9.79
11	West Bengal,Jharkhand & Sikkim	0	6	3.09
12	Rest of India	0	0	0.00
Total		**97**	**97**	**100**



Appendix-VI

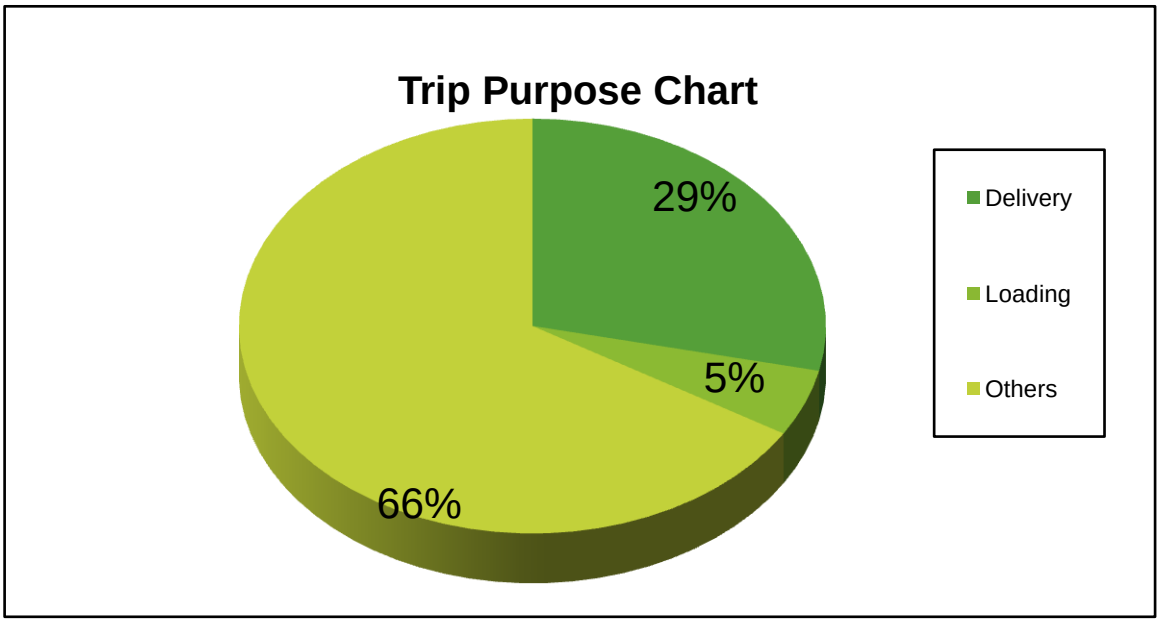
Trip Purpose Chart

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Name : Dudhnoi-Damra (5.00 Km) Date: 11/23/2018

Location: At km 3+500 (Near Damra A.S.A. Play Ground)

Purpose of Trip	Total No	Composition (%)
Delivery	82	28.5
Loading	15	5.2
Others	191	66.3
Total	**288**	**100**



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Appendix-VI

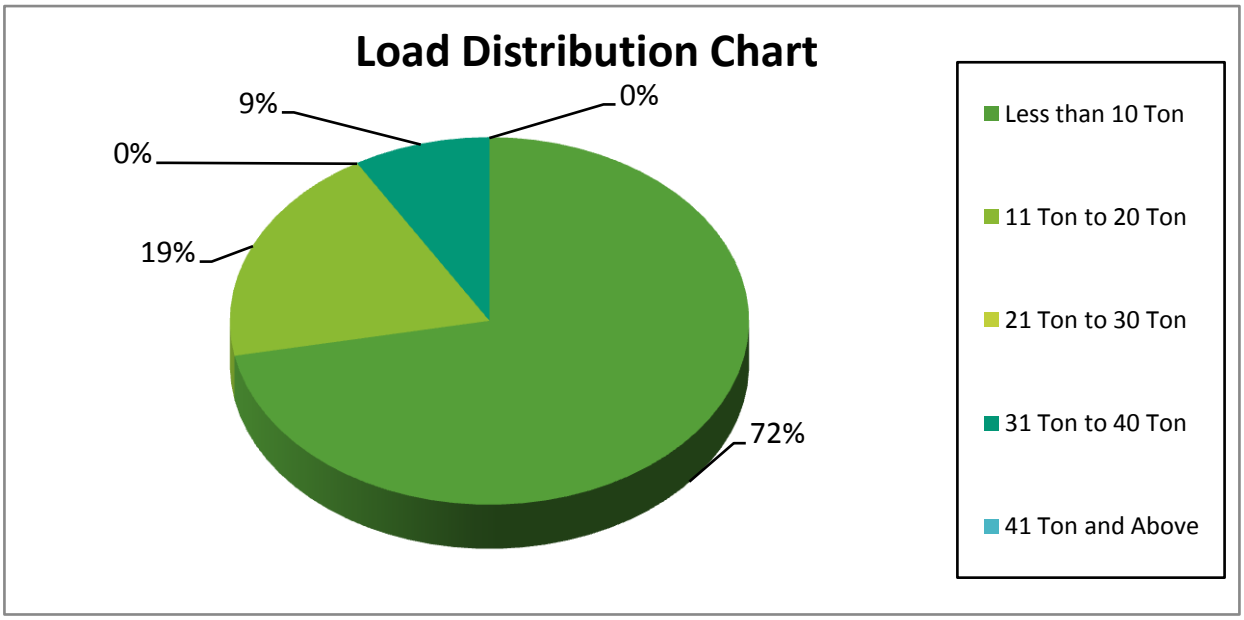
Load Distribution Pattern

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Name: Dudhnoi-Damra (5.00 Km) Date: 11/23/2018

Location: At km 3+500 (Near Damra A.S.A. Play Ground)

Load Distribution	Total No	Composition
Less than 10 Ton	59	72.0
11 Ton to 20 Ton	16	19.5
21 Ton to 30 Ton	0	0.0
31 Ton to 40 Ton	7	8.5
41 Ton and Above	0	0.0
Total	**82**	**100.0**



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Appendix-VI

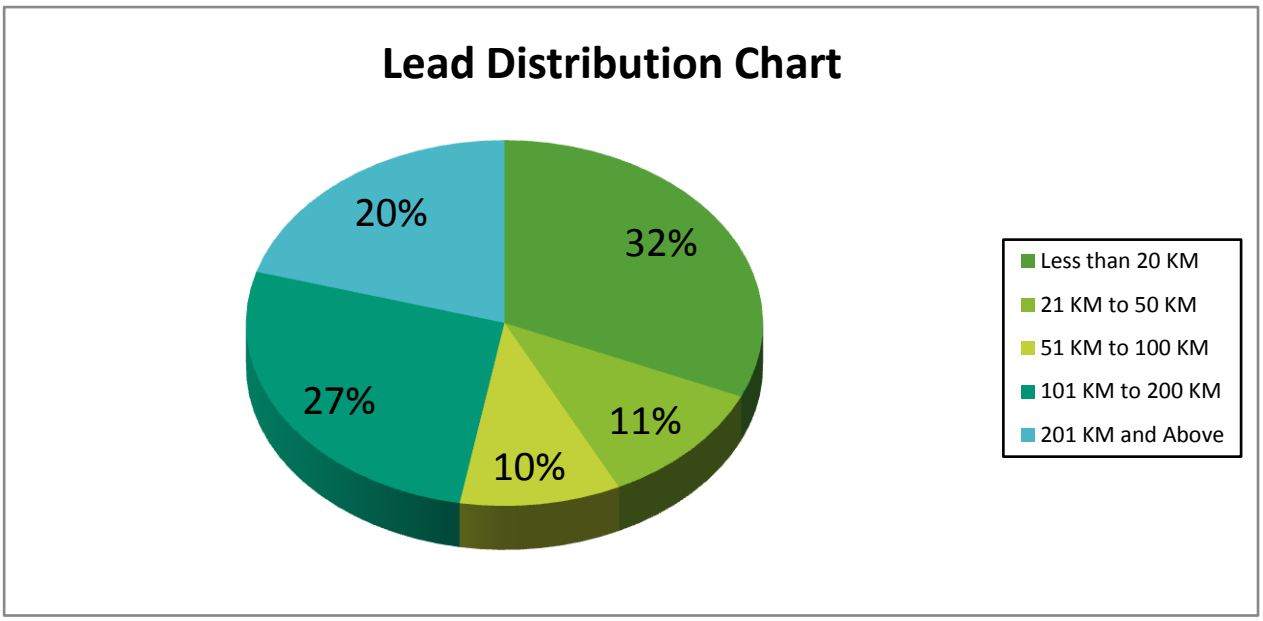
Lead Distribution Pattern

Package No.: NHIDCL/BHARATMALA/DPR/PHASE1/LOT1/PKG 1A/PKG1B/2018

Road Name: Dudhnoi-Damra (5.00 Km) **Date:** 11/23/2018

Location: At km 3+500 (Near Damra A.S.A. Play Ground)

Lead Pattern	Total No	Composition
Less than 20 KM	91	31.60
21 KM to 50 KM	32	11.11
51 KM to 100 KM	29	10.07
101 KM to 200 KM	77	26.74
201 KM and Above	59	20.49
Total	**288**	**100.00**



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TYPE - 01

TYPICAL CROSS SECTION FOR 2 - LANE WITH PAVED SHOULDER HIGHWAY OVERLAY WIDENING (BUILT-UP SECTION WITH)

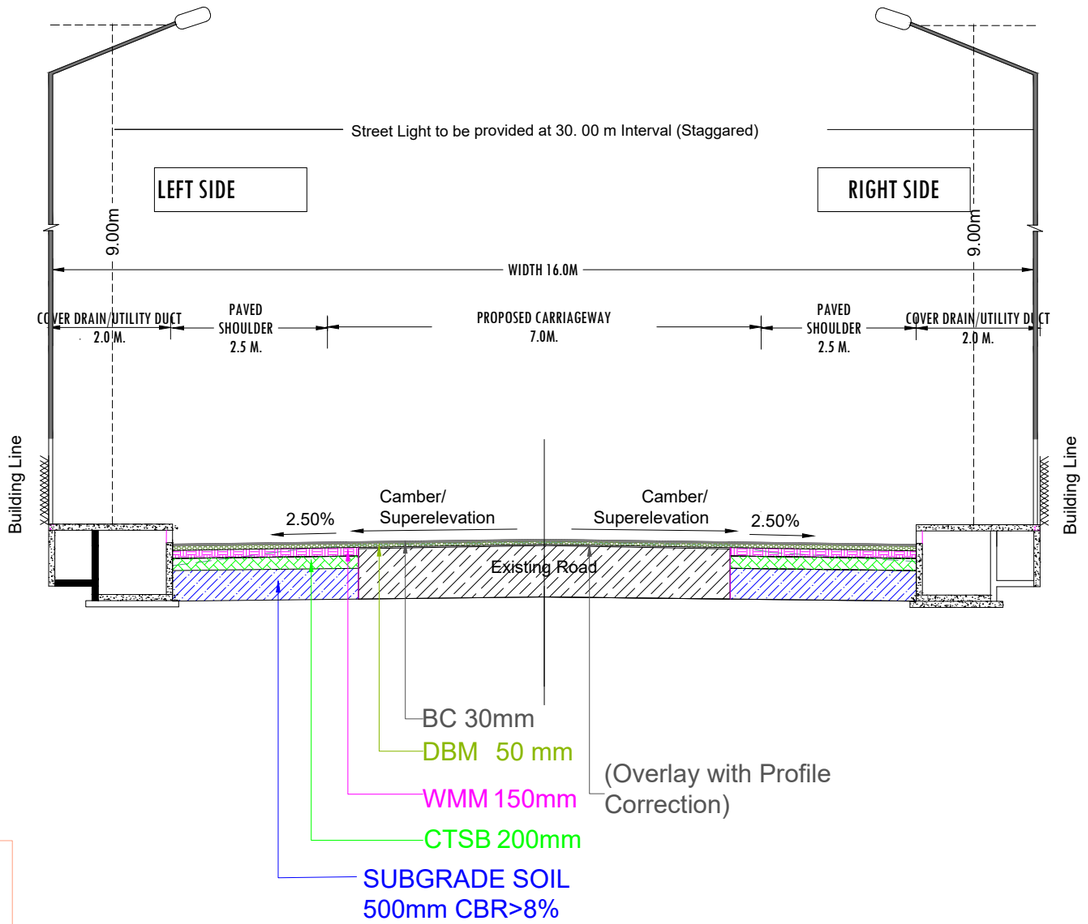
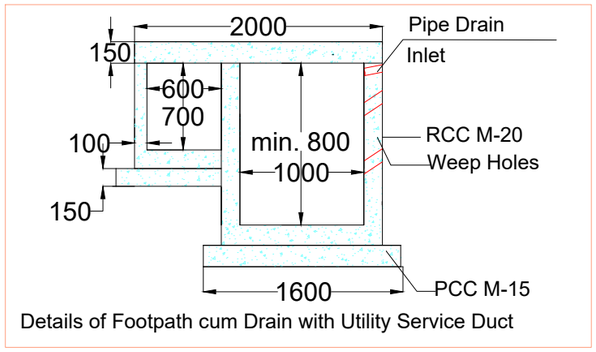


Fig. 2.9 Modified
As per IRC SP 73: 2018



Details of Footpath cum Drain with Utility Service Duct

NOTES:

1. ALL DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DIMENSIONS SHALL NOT BE SCALED OFF FROM THE DRAWING. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type
1	0.040	0.650	0.610	1
2	0.650	1.360	0.710	1
3	1.700	2.160	0.460	1
4	2.400	3.390	0.990	1
5	4.230	4.525	0.295	1
6	4.525	4.600	0.075	1
7	5.530	5.900	0.370	1
8	8.250	8.415	0.165	1
	Total Length		3.675	

REV.	DATE	REVISIONS

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI BUILDING, 4 PARLIAMENT STREET
SANSAD MARG AREA, NEW DELHI -110001

DESIGN CONSULTANT:
Global Infra Solutions
in JV with **Krishna Techno Consultant**.
F-2, E-8/11A, Global Tower, Trilanga, Bhopal -462039
e: globalinfrasolutions.bpl@gmail.com **web:** globalinfrasolutions.org

PROJECT:
CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJNA (LOT-01) -(PKG-1B)- DUDHNOI-DAINADUBI ROAD (NH-217) IN THE STATE ON MEGHALAYA.

SCALE:
Not to scale
Dimensions as mentioned

TITLE:
TYPICAL CROSS SECTION

CLIENT APPROVAL:	SIGNATURE:		
DWG NO:- GIS/1B/NHIDCL/FS/TCS			
DRAWN:	CHECKED:	DESIGNED:	APPROVED:
LK	SJ	SC	LA

TYPE - 02

TYPICAL CROSS SECTION FOR 2 - LANE WITH PAVED SHOULDER HIGHWAY OVERLAY WIDENING (BUILT-UP SECTION WITH)

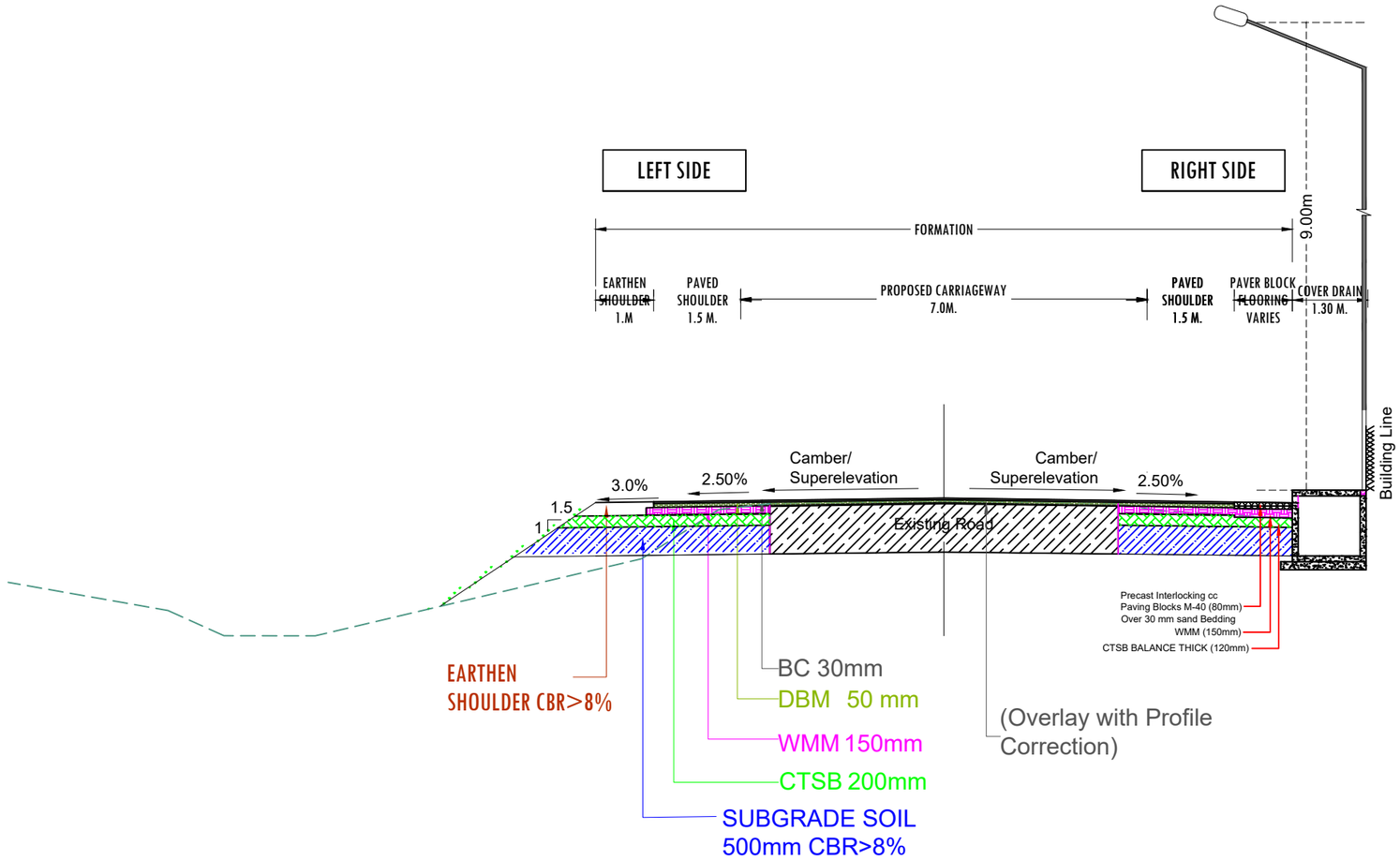


Fig. 2.9 Modified
As per IRC SP 73: 2018

NOTES:

1. ALL DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DIMENSIONS SHALL NOT BE SCALED OFF FROM THE DRAWING. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type
1	2.160	2.400	0.240	2
2	3.390	3.550	0.160	2
3	4.600	4.720	0.120	2
	Total Length		**0.520**	

REV.	DATE	REVISIONS

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI BUILDING, 4 PARLIAMENT STREET
SANSAD MARG AREA, NEW DELHI -110001

DESIGN CONSULTANT:
Global Infra Solutions
in JV with **Krishna Techno Consultant**.
F-2, E-8/11A, Global Tower, Trilanga, Bhopal -462039
e: globalinfrasolutions.bpl@gmail.com **web:** globalinfrasolutions.org

PROJECT:
CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJNA (LOT-01) -(PKG-1B)- DUDHNOI-DAINADUBI ROAD (NH-217) IN THE STATE ON MEGHALAYA.

SCALE: Not to scale
Dimensions as mentioned

TITLE: TYPICAL CROSS SECTION

CLIENT APPROVAL: | SIGNATURE:

DWG NO:- GIS/1B/NHIDCL/FS/TCS

DRAWN:	CHECKED:	DESIGNED:	APPROVED:
LK	SJ	SC	LA

TYPE - 03

TYPICAL CROSS SECTION FOR 2 - LANE WITH PAVED SHOULDER HIGHWAY OVERLAY WIDENING (OPEN COUNTRY -PLAIN TERRAIN)

BANKING SECTION
HEIGHT LESS THAN 3m

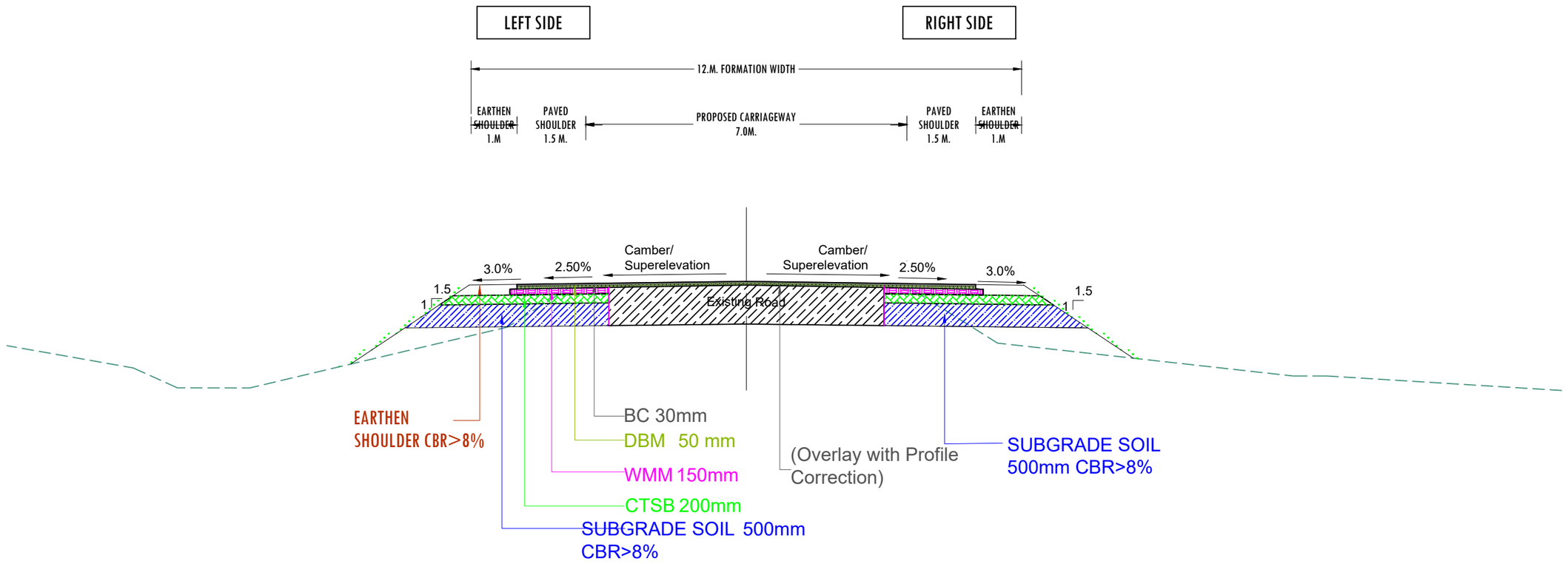


Fig. 2.9 Modified
As per IRC SP 73: 2018

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type
1	1.360	1.700	0.340	3
2	3.550	3.650	0.100	3
3	4.720	5.200	0.480	3
4	5.900	8.250	2.350	3
	Total Length		**3.270**	

NOTES:

1. ALL DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DIMENSIONS SHALL NOT BE SCALED OFF FROM THE DRAWING. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED

REV.	DATE	REVISIONS

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI BUILDING, 4 PARLIAMENT STREET
SANSAD MARG AREA, NEW DELHI -110001

DESIGN CONSULTANT:
Global Infra Solutions
in JV with **Krishna Techno Consultant**.
F-2, E-8/11A, Global Tower, Trilanga, Bhopal -462039
e: globalinfrasolutions.bpl@gmail.com **web:** globalinfrasolutions.org

PROJECT:
CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJNA (LOT-01) -(PKG-1B)- DUDHNOI-DAINADUBI ROAD (NH-217) IN THE STATE ON MEGHALAYA.

SCALE:
Not to scale
Dimensions as mentioned

TITLE:
TYPICAL CROSS SECTION

CLIENT APPROVAL: | SIGNATURE:

DWG NO:- GIS/1B/NHIDCL/FS/TCS

DRAWN:	CHECKED:	DESIGNED:	APPROVED:
LK	SJ	SC	LA

TYPE - 04

TYPICAL CROSS SECTION FOR 2 - LANE WITH PAVED SHOULDER HIGHWAY (OPEN COUNTRY -PLAIN TERRAIN)

BANKING SECTION
HEIGHT LESS THAN 3m

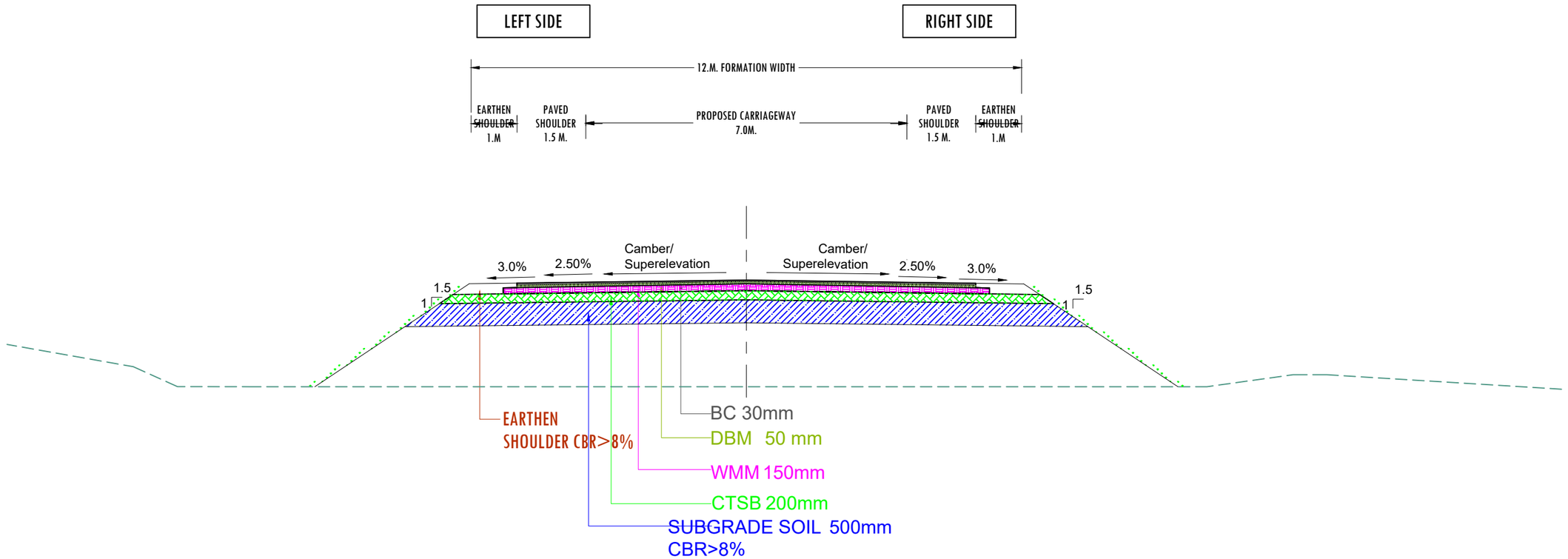


Fig. 2.9 Modified
As per IRC SP 73: 2018

NOTES:

1. ALL DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DIMENSIONS SHALL NOT BE SCALED OFF FROM THE DRAWING. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type
1	3.650	3.740	0.090	4
2	3.900	4.230	0.330	4
3	5.200	5.380	0.180	4
	Total Length		**0.600**	

REV.	DATE	REVISIONS

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI BUILDING, 4 PARLIAMENT STREET
SANSAD MARG AREA, NEW DELHI -110001

DESIGN CONSULTANT:
Global Infra Solutions
in JV with **Krishna Techno Consultant**.
F-2, E-8/11A, Global Tower, Trilanga, Bhopal -462039
e: globalinfrasolutions.bpl@gmail.com **web:** globalinfrasolutions.org

PROJECT:
CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJNA (LOT-01) -(PKG-1B)- DUDHNOI-DAINADUBI ROAD (NH-217) IN THE STATE ON MEGHALAYA.

SCALE:
Not to scale
Dimensions as mentioned

TITLE:
TYPICAL CROSS SECTION

CLIENT APPROVAL:	SIGNATURE:

DWG NO:- GIS/1B/NHIDCL/FS/TCS

DRAWN:	CHECKED:	DESIGNED:	APPROVED:
LK	SJ	SC	LA

TYPE - 05

TYPICAL CROSS SECTION FOR 2 - LANE WITH PAVED SHOULDER HIGHWAY (OPEN COUNTRY -PLAIN TERRAIN)

CUTTING SECTION

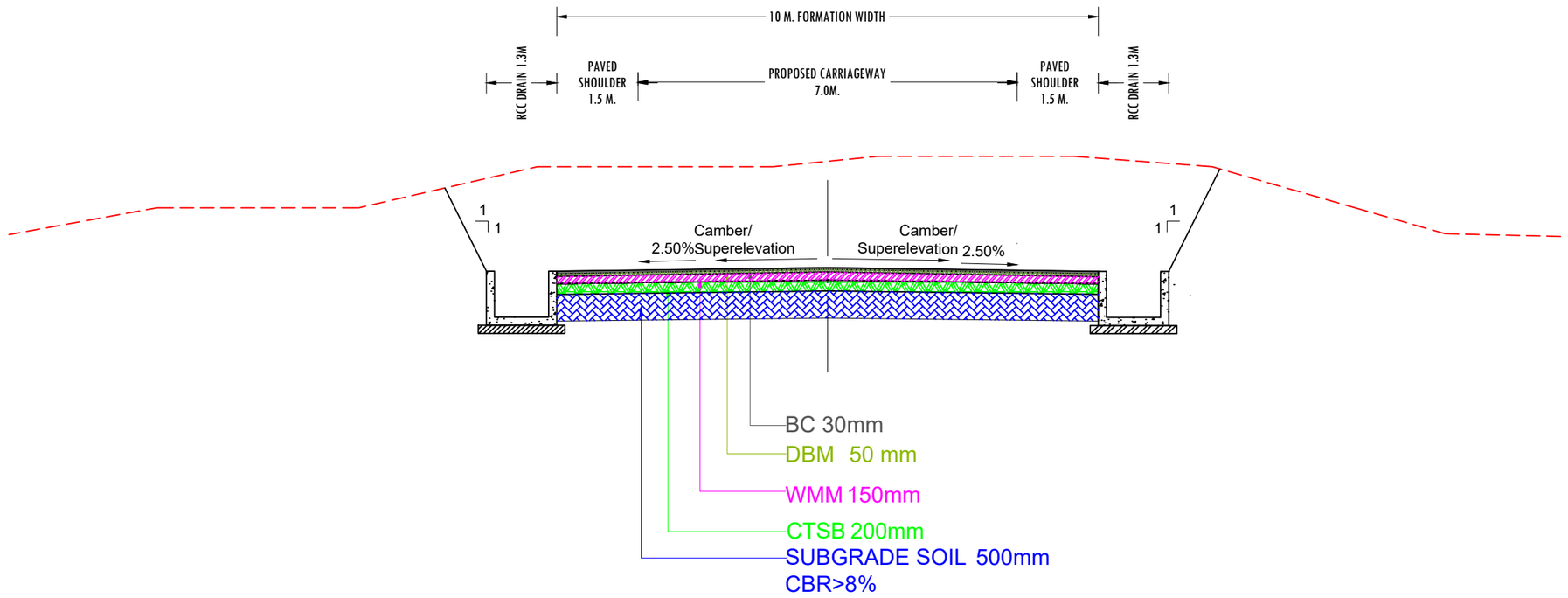


Fig. 2.9 Modified
As per IRC SP 73:
2018

NOTES:

1. ALL DIMENSIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. DIMENSIONS SHALL NOT BE SCALED OFF FROM THE DRAWING. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED

Sr. No.	Chainage From (Km.)	Chainage To (Km.)	Length (Km)	TCS Type
1	3.740	3.900	0.160	5
	Total Length		**0.160**	

REV.	DATE	REVISIONS

NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI BUILDING, 4 PARLIAMENT STREET
SANSAD MARG AREA, NEW DELHI -110001

DESIGN CONSULTANT:
Global Infra Solutions
in JV with **Krishna Techno Consultant**.
F-2, E-8/11A, Global Tower, Trilanga, Bhopal -462039
e: globalinfrasolutions.bpl@gmail.com **web:** globalinfrasolutions.org

PROJECT:
CONSULTANCY SERVICES FOR PREPARATION OF DPR FOR ECONOMIC CORRIDORS, INTER CORRIDORS AND FEEDER ROUTES TO IMPROVE THE EFFICIENCY OF FREIGHT MOVEMENT IN INDIA UNDER BHARATMALA PARIYOJNA (LOT-01) -(PKG-1B)- DUDHNOI-DAINADUBI ROAD (NH-217) IN THE STATE ON MEGHALAYA.

SCALE:
Not to scale
Dimensions as mentioned

TITLE:
TYPICAL CROSS SECTION

CLIENT APPROVAL:	SIGNATURE:

DWG NO:- GIS/1B/NHIDCL/FS/TCS

DRAWN:	CHECKED:	DESIGNED:	APPROVED:
LK	SJ	SC	LA

APPENDIX-VIII

ASSAM POWER DISTRIBUTION COMPANY LIMITED
Regd Office: Bijulee Bhawan, Paltan Bazaar, Guwahati-781001, Assam.
(CIN: U4109AS2003SGC007242)
OFFICE OF THE CHIEF EXECUTIVE OFFICER::BONGAIGAON ELECTRICAL CIRCLE
Email id: DGM.BONGAIGAON_EC@apdcl.org

No. : CEO/BEC/APDCL/39(G)/2022-23/ 1074 **Date :** 21/09/2022

To,

The Sub-Divisional Engineer,
Dudhnoi Electrical Sub-Division,
APDCL(LAR), Dudhnoi, Goalpara.

Ref : Letter No. : CGM(D)/APDCL/LAR/NHIDCL/2019-20/54 Dtd. 07.09.2022

Sub : Serving necessary bills to NHIDCL.

Enclose please find herewith the copy of approved estimates regarding proposed widening of 2 Lane NH from Dudhnoi to Dainadubi as received from the Chief General Manager (D&S) as mentioned in the letter under reference to raise necessary bills to the concerned consumer.

This is for your urgent necessary action.

Enclo : Copy of estimates as stated above.

Chief Executive Officer,
Bongaigaon Electrical Circle,
APDCL, Bongaigaon

Memo No. : CEO/BEC/APDCL/39(G)/2022-23/ **Date :**

Copy to:

1. The AGM, GED, APDCL, Goalpara for information and necessary action.
2. Office Copy.

Chief Executive Officer
Bongaigaon Electrical Circle,
APDCL, Bongaigaon

ASSAM POWER DISTRIBUTION COMPANY LIMITED.
OFFICE OF THE CHIEF GENERAL MANAGER (D), (LOWER ASSAM REGION)
CIN: U40109AS2003SGC007242

APPENDIX-VIII

No. CGM(D)/ APDCL/ LAR/ NHIDCL/2019-20/ 54 Date: 07/09/2022

To,
The Chief Executive Officer,
Bongaigaon Electrical Circle
APDCL, LAR, Bongaigaon

Sub: Approval of provisional estimate under deposit work.

Ref: Letter No. APDCL/BEC/CEO/Tech-39(G)/DW/2022/988 dt. 05.09.2022.

With reference to the subject cited above, approval is hereby accorded against provisional estimates amounting to Rs. 4,72,86,643.36 (Rupees four crore seventy two lakh eighty six thousand six hundred forty three and paise thirty six) only and payable amount of Rs. 1,90,676.00 (Rupees one lakh ninety thousand six hundred seventy six) only for shifting of 11KV & LT lines including dismantling of existing networks from Dudhnoi to Dainadubi for widening of National Highway by NHAI under deposit scheme of Dudhnoi Electrical Sub Division. The detail of estimates is as follows:-

Sl. No.	Particulars	Estimated Amount (Rs.) (Inclusive of GST)	Party Supply Amount (Rs.) inclusive GST	Payable Amount(Rs.)
1	Provisional Estimate for construction of 11KV LT lines along the proposed widening of 2lane NH from Dudhnoi to Dainadubi	2,10,08,301.49	2,09,10,798.43	97,503.00
2	Provisional Estimate for installation of different sub Station along the proposed widening of 2lane NH from Dudhnoi to Dainadubi	93,64,696.60	93,24,225.48	40,471.00
3	Provisional Estimate for dismantling of existing HT & LT lines along the proposed widening of 2lane NH from Dudhnoi to Dainadubi	1,69,13,645.27	1,68,60,943.02	52,702.00
	Total :- Rs.	4,72,86,643.36	4,70,95,966.93	1,90,676.00

Approval is hereby accorded for supply of materials & execution of work subject to the following conditions:-

6) The materials to be procured should be as per specification of APDCL and conforming to specification laid down in BIS/ISS code with latest amendment at their own cost. The purchase documents should be thoroughly verified by the authorized officers of APDCL (LAR).
7) The materials are to be procured from the approved vendors list of APDCL.
8) The Guaranteed Technical particulars of the materials to be procured by the consumer should be duly verified and approved by the concerned GM/CEO/AGM before procurement of the materials.
9) Construction of the lines & substation's should be executed by the party through empanelled contractor of APDCL having valid electrical contractor license issued by the competent authority of GOA under the supervision of APDCL for which supervision charge should be deposited to APDCL by the applicant.
10) All safety norms as per I E rules/regulations are to be followed.

The above works shall be taken up after realizing the estimated amount from the party concerned by observing all formalities as per APDCL norms. Dismantling materials if any are to be deposited in the concerned circle store and kept proper record in store ledger. Necessary right of way for execution of the above works shall be arranged by the concerned department. The estimated amount is to be deposited within 6 (Six) months from the date of serving bills. Inordinate delay in deposition of estimated amount may call for preparation of fresh estimates due to possible price escalation.

The lines and sub-stations may be charged after receipt of permission from the CEI & A, GOA and after observing all formalities as per Terms & Conditions notified by AERC.

Enclosed: Approved estimates.

Chief General Manager (D&S),
APDCL, LAR
Date: 07/09/2022

Memo No. CGM(D)/ APDCL/ LAR/ NHIDCL/2019-20/ 54 (a)

Copy to:-
1. The AGM, Goalpara Electrical Division , APDCL, LAR, for information.

Chief General Manager (D&S)
APDCL, LAR

O/O THE SUB-DIVISIONAL ENGINEER, DUDHNOI ELECTRICAL SUB-DIVISION, APDCL, DUDHNOI

Name of Work: Revised Provisional Estimate for construction of 11 kV line and LT line along the Proposed widening of 2 Lane NH from Dudhnoi to Damadubi.

Name of Location: Dudhnoi to Damadubi

Name of Scheme: Deposit Work

Name of Feeder: 11 kV Matia, Damra, Dudhnoi and Lela Feeders

APPENDIX-VIII

Sl. No.	Item Specification	Unit	Qty.	Provisional Estimate		
				Rate without GST (Rs.)	Cost of Materials without GST (Rs.)	Party Supply Amount without GST (Rs.)
1	GI Steel Tubular Pole SP-66	Nos	35	33625.00	1176875.00	1176875.00
2	PSC Pole 9.75 m	Nos	210	7030.80	1476468.00	1476468.00
3	PSC Pole 8.5 m	Nos	190	5315.10	1009869.00	1009869.00
4	GI 11 KV.T Cross Arm with angle size 50x50x6 mm	Nos	145	862.50	125062.50	125062.50
5	GI Channel Cross Arm (100x50x6x2200)mm	Nos	80	2012.50	161000.00	161000.00
6	GI Channel Cross Arm (100x50x6x2800)mm	Nos	90	2221.80	199962.00	199962.00
7	11 KV Pin Insulator (Polymer) 5 KN (FRP 24 mm)	Nos	492	262.50	129150.00	129150.00
8	11 KV Disc Insulator(Polymer) 70kN (D&S Type)	Nos	228	315.00	71820.00	71820.00
9	HW fitting for Disc Insulator T&C 70kN tension type	Nos	228	395.00	90060.00	90060.00
10	ACSR "Raccon" Conductor	Km	20.2	76160.00	1538432.00	1538432.00
11	HT Stay Set	Set	55	546.25	30043.75	30043.75
12	11 KV Guy Insulator (Porcelain)	Nos	55	52.50	2887.50	2887.50
13	Hot Dip GI Wire Stay Wire 7/10 SWG (for HT)	Kg	550	87.40	48070.00	48070.00
14	GI Angle (40x40x5) mm	Mtr	45	396.75	17853.75	17853.75
15	GI Angle (50x50x6) mm	Mtr	450	432.40	194580.00	194580.00
16	Hot Dip GI Wire 8 SWG	Kg	760	93.15	70794.00	70794.00
17	Hot Dip GI Wire 6 SWG	Kg	70	79.35	5554.50	5554.50
18	3Cx120 + 1Cx95sqmm (Messenger cum neutral) + 1Cx25 sqmm for street lighting	Mtr	12750	394.00	5023500.00	5023500.00
19	Anchor Clamp Wedge Type LT ABC as per NFC Standard	Nos	110	378.33	41616.67	41616.67
20	Suspension Clamp ABC as per NFC Standard	Nos	420	226.67	95200.00	95200.00
21	Cable end caps for ABC cables	Nos	60	19.00	1140.00	1140.00
22	ASA Distribution box with pre-fitted lug for 250A 3 Ph 10 connectors with spring loaded Busbar system for service connection	Nos	90	5950.00	535500.00	535500.00
23	ASA Distribution box for 140A 1 Ph 10 connectors with spring loaded Busbar system	Nos	310	2450.00	759500.00	759500.00
24	Steel Strap for installing DB size 20 mm x 1 m long	Nos	310	63.00	19530.00	19530.00
25	Buckle for steel strap for DB fixing	Nos	310	22.67	7027.70	7027.70
26	Eye Hook for Anchor and Suspension Clamp.	Nos	530	71.00	37630.00	37630.00
27	CI Earth pipe 1.8 m inner dia 100 mm, outer dia 110 mm with perforated holes of 15 mm dia at 30 cm interval along length of pipe	Nos	30	1312.50	39375.00	39375.00
28	Jointing Sleeve for Raccon	Nos	25	122.67	3066.75	3066.75
29	PG Clamp for ACSR Raccon	Nos	245	105.25	25786.25	25786.25
30	Pole Clamp of GI flat 50x6 mm	Nos	1610	85.05	136930.50	136930.50
31	Insulating piercing connector IPC P2.95 for DB charging as per NFC	Nos	1250	83.00	103750.00	103750.00
32	LT PVC Cable (Aluminum) 1C x 16 sq.mm	Mtr	450	29.47	13262.21	13262.21
33	LT Stay Set	Nos	25	409.40	10235.00	10235.00
34	LT Guy Insulator (Porcelain)	Nos	25	31.50	787.50	787.50
35	Hot Dip GI Wire Stay Wire 7/14 SWG (For LT)	Kg	250	98.90	24725.00	24725.00
36	GI Barbed Wire Type A	Kg	120	93.15	11178.00	11178.00
37	11 KV.Danger Plate	Nos	210	57.50	12075.00	12075.00
38	GI Nuts & Bolts with washer (Assorted)	Kg	850	93.15	79177.50	79177.50
A	Cost of Materials				13329475.08	13329475.08
B	Transportation and storage 5%				666473.75	666473.75
C	A+B				13995948.83	13995948.83
D	Contigency 3% on C				419878.46	419878.46
E	15 % Labour Charge on C				2099392.32	2099392.32
F	Grouting and muffering of steel tubular pole of type SP-66 as per specification and drawing with minimum planting depth of 2.15 m (using PCC)	Job	35.00	4,950.94	173282.90	173282.90
	Grouting and muffering of prestressed concrete pole of length 9.75 m as per specification and drawing with minimum planting depth of 1.5 m (using PCC)	Job	210.00	1,894.28	397798.80	397798.80
	Grouting & muffering of prestressed concrete pole of length 8.5 m as per specification and drawing with minimum planting depth of 1.5 m (using PCC)	Job	190.00	1,787.97	339714.30	339714.30
	Grouting of Stay Set with PCC and Boulder	Job	45.00	1,000.00	45000.00	45000.00
	Jungle Cutting & Compensation to beneficiary for clearing	Job	1.00	250000.00	250000.00	250000.00
G	Supervision Charges 2.5% on E+F				82629.71	0.00
H	Sub Total (C+D+E+F+G)				17803645.33	17721015.62
I	GST @ 18% on H				3204656.16	3189782.81
	Sub Total (H+I)				21008301.49	20910798.43
	Less Party Supply				20910798.43	
	Amount Payble to APDCL				97503.06	
				Say Rs.	97503.00	

Amount Payable to APDCL is Rupees Ninety Seven Thousand Five Hundred Three Only

Approved
CGM (T&S)
APDCL (LAR) Bijulee Bhav
Paltan Bazar, Guwahati

S/D
Junior Manager
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Sub-Divisional Engineer
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Assistant General Manager
Goalpara Electrical Division
APDCL, Dhaluksubi, Goalpara

Recommended by

O/O THE SUB-DIVISIONAL ENGINEER, DUDHNOI ELECTRICAL SUB-DIVISION

Name of Work: Revised Provisional Estimate for Installation of Different Capacity SS along the Proposed widening of 2 Lane NH from Dudhnoi to Dalnadubi.

Name of Location: Dudhnoi to Dalnadubi.

Name of Scheme: Deposit Work.

Name of Feeder: 11 kV Matia, Damru, Dudhnoi and Lela Feeders.

APPENDIX-VIII

Sl. No.	Item Specification	Unit	Qty.	Rate without GST (Rs.)	Provisional Estimate: Cost of Materials without GST (Rs.)	Provisional Estimate: Party Supply Amount without GST (Rs.)
1	PSC Pole 9.75m	No.	20	7,030.80	140,616.00	140,616.00
2	11/0.4KV 500KVA DTR Copper Wound - BIS Level - 2	No.	1	1,101,059.32	1,101,059.32	1,101,059.32
3	11/0.4KV 250KVA DTR Copper wound - BIS Level - 2	No.	2	572,805.00	1,145,610.00	1,145,610.00
4	11/0.4KV 63KVA DTR Aluminium WoundBIS Level - 3	No.	5	198,135.59	990,677.97	990,677.97
5	11/0.4KV 100KVA DTR Aluminium Wound - BIS Level - 3	No.	1	258,983.05	258,983.05	258,983.05
6	11/0.4KV, 25KVA DTR Aluminium Wound BIS Level-2	No.	1	75,995.76	75,995.76	75,995.76
7	GI Channel Cross Arm (100x50x6x2200mm)	No.	128	2,012.50	257,600.00	257,600.00
8	Pole Clamp of GI Flat 50x6mm	No.	256	85.05	21,772.80	21,772.80
9	ACSR " RACCON" Conductor	No.	0.2	76,160.00	15,232.00	15,232.00
10	11KV GOAB Switch 400Amp	Set	10	8,450.00	84,500.00	84,500.00
11	11KV DO Fuse Set 200A Assembly	Set	10	3,400.00	34,000.00	34,000.00
12	11KV 5KA Lightning Arrestor (Line Type, Distribution Class)	Set	10	2,646.00	26,460.00	26,460.00
13	CI Earth Pipe 1.8m Inner dia 100mm	No.	60	1,312.50	78,750.00	78,750.00
14	HT Stay Set	No.	20	546.25	10,925.00	10,925.00
15	Hot Dip GI Wire Stay Wire 7/10 SWG (for HT)	No.	200	87.40	17,480.00	17,480.00
16	11 KV Guy Insulator (Porcelain)	No.	20	52.50	1,050.00	1,050.00
17	GI Wire 6 SWG for Earthing	No.	250	79.35	19,837.50	19,837.50
18	11 kV Pin Insulator (Polymer) 5KN (FRP 24mm)	No.	48	262.50	12,600.00	12,600.00
19	11 kV Disc Insulator (Porcelain) 70kN (T&C Type)	No.	48	504.00	24,192.00	24,192.00
20	H/W fitting for Disc Insulator T&C 90kN tension type	No.	48	500.00	24,000.00	24,000.00
21	LT PVC Cable Armoured 4C x 95 sq.mm.	Mtr.	400	508.33	203,332.00	203,332.00
22	DTR Cubical for 63KVA DTRs (comprising of requisite one	Set	5	129,071.00	645,355.00	645,355.00
23	DTR Cubical for 500KVA DTRs (comprising of requisite one	Set	1	216,364.00	216,364.00	216,364.00
24	DTR Cubical for 250KVA DTRs (comprising of requisite one	Set	2	160,705.00	321,410.00	321,410.00
25	DTR Cubical for 100KVA DTRS (comprising of requisite one	Set	1	155,945.00	155,945.00	155,945.00
26	DTR Cubical for 25KVA DTRs (comprising of requisite one	Set	1	128,374.00	128,374.00	128,374.00
27	HT Danger Plate	No.	20	57.50	1,150.00	1,150.00
28	G.I Nuts & Bolts (Assorted)	Kg	240	93.15	22,356.00	22,356.00
29	Aluminium Lugs-25 Sq mm	No.	36	7.00	252.00	252.00
	Aluminium Lugs-95 Sq mm	No.	96	21.00	2,016.00	2,016.00
A	Total Cost of Materials Rs.				6,037,895.40	6,037,895.40
B	5% Transportation Charge on A				301,894.77	301,894.77
C	Total Rs. (A+B)				6,339,790.17	6,339,790.17
D	15% Labour Charge on C				950,968.53	950,968.53
E	3% Contigency Charge on C				190,193.71	190,193.71
F	DTR Fencing as per REC standard specification	Job	10	36,304.80	363,048.00	363,048.00
	Grouting of Stay Set with PCC and Boulder	Job	20	1,000.00	20,000.00	20,000.00
	Grouting of PSC Pole 9.75m	No.	20	1,894.28	37,885.60	37,885.60
G	2.5% Supervision Charge on D+F				34,297.55	
H	Total Rs. (C+D+E+F+G)				7,936,183.56	7,901,886.00
I	GST @ 18% of H				1,428,513.04	1,422,339.48
	Total Amount				9,364,696.60	9,324,225.48
	Less Party Supply Amount				9,324,225.48	
	Amount Payable to APDCL				40,471.11	
				Say Rs.	40,471.00	

Amount Payable to APDCL is Rupees Forty Thousand Four Hundred Seventy One Only

S/D
Junior Manager
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Sub-Divisional Engineer
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Assistant General Manager
Goalpara Electrical Division
APDCL, Bhalukdubi, Goalpara

Recommended by

Approved
CGM (D&S)
APDCL (LAR), Bijulee Bhawan, Guwahati

Assit. Manager (Elect.)
Bongaigaon Elect. Circle,
APDCL (LAZ) Bongaigaon

Assit. Manager (Acctt)
Bongaigaon Elect. Circle
A.P.D.C.L. (LAR) Bongaigaon

Chief Executive Officer
Bongaigaon Electrical Circle
APDCL, LAZ, Bongaigaon

ASSAM POWER DISTRIBUTION COMPANY LIMITED

O/O THE SUB-DIVISIONAL ENGINEER, DUDHNOI ELECTRICAL SUB-DIVISION, APDCL, DUDHNOI

Name of Work: Revised Provisional Estimate for dismantling of existing HT & LT line along the Proposed Widening of 2 Lane NH from Dudhnoi to Dalmadubi.

Name of Location: Dudhnoi to Dalmadubi.

APPENDIX-VIII

Name of Scheme: Deposit Work.

Name of Feeder: 33 kV Agia & Damani feeder; 11 kV Malla, Lela, Dudhnoi and Damra feeders.

Sl. No.	Item Specification	Unit	Qty.	Provisional Estimate: Rate without GST (Rs.)	Provisional Estimate: Cost of Materials without GST (Rs.)	Party Supply Amount without GST (Rs.)
1	PSC Pole 8.5 m	Nos	157	5315.10	834470.70	834470.70
2	PSC Poles, 9.75 m	Nos	182	7030.80	1279605.60	1279605.60
3	GI Steel Tubular Pole SP-76 (14.50)	Nos	25	39,590.67	989766.67	989766.67
4	GI LT Angle Cross Arm (40x40x6x5000mm)	Nos	436	197.80	86240.80	86240.80
5	LT Pin Insulator (Porcelain)	Nos	812	31.50	25578.00	25578.00
6	LT GI Pin	Nos	812	41.5	33698.00	33698.00
7	Shackle Insulator Porcelain	Nos	138	47.25	6520.50	6520.50
8	GI Channel Cross Arm (100x50x6x2200)mm	Nos	130	2012.50	261625.00	261625.00
9	GI 33KV "V" Cross Arm with channel size 100x50x6mm	Nos	62	1812.40	112368.80	112368.80
10	HT Stay Set	Set	35	546.25	19118.75	19118.75
11	Pole Clamp of GI flat 50x6 mm	Nos	1438	85.05	122301.90	122301.90
12	11 KV Disc Insulator (Porcelain) 70kN (B&S Type)	Nos	292	504.00	147168.00	147168.00
13	11 kKV Pin Insulator (Polymer) 5kN (FRP 24 mm)	Nos	375	262.50	98437.50	98437.50
14	33 kV Disc Insulator (Porcelain) 90kN (T&C Type)		150	479.85	71977.50	71977.50
15	33 kV Pin Insulator (Porcelain)		180	512.40	92232.00	92232.00
16	GI 11 KV T Cross Arm with angle size 50x50x6 mm	Nos	280	862.50	241500.00	241500.00
17	ACSR "Weasel" Conductor	Km	21	32770.56	688181.76	688181.76
18	ACSR "Raccon" Conductor	Km	19	76160.00	1447040.00	1447040.00
19	ACSR "WOLF" Conductor	Km	1.7	185,640.00	315588.00	315588.00
20	3Cx120 + 1Cx95sqmm (Meassenger cum neutral) + 1Cx25 sqmm for street lightning	Mtr	2200	394.00	866800.00	866800.00
21	11/04KV 25 KVA DTR Aluminium Wound BIS Level-	Nos	1	75995.76	75995.76	75995.76
22	11/04KV 63 KVA DTR Aluminium Wound BIS Level-2	Nos	5	153136.00	765680.00	765680.00
23	11/0.4KV 100KVA DTR Aluminium Wound - BIS Level - 3	Nos	1	258,983.05	258983.05	258983.05
24	11/0.4KV 250KVA DTR Copper wound - BIS Level-2	Nos	2	572,805.00	1145610.00	1145610.00
25	11/0.4KV 500KVA DTR Copper Wound - BIS Level-2	Nos	1	1,101,059.32	1101059.32	1101059.32
26	11 KV GOAB Switch 150Amp	set	10	7783.33	77833.30	77833.30
27	11 KV DO Fuse Set 150A Assembly	set	10	3300.00	33000.00	33000.00
28	11KV 5KA Lightning Arrestor Line Type distribution class	set	10	2646.00	26460.00	26460.00
29	CI Earth pipe 1.8 m inner dia 100 mm, outer dia 110 mm with perforated holes of 15 mm dia at 30 cm interval along length of pipe	Nos	90	1312.50	118125.00	118125.00
A	Cost of Materials				11342965.91	11342965.91
B	Transportation and storage 5%				567148.30	567148.30
C	A+B				11910114.21	11910114.21
D	Contigency 3% on C				357303.43	357303.43
E	Labour Charge 15% on C				1786517.13	1786517.13
F	Disconnection & Reconnectionof Service Connection	Job	470	500.00	235000.00	235000.00
G	Supervision Charges 2.5% on E				44662.93	
H	Sub Total (C+D+E+F+G)				14333597.69	14288934.76
I	GST @ 18% on H				2580047.58	2572008.26
	Sub Total (H+I)				16913645.27	16860943.02
	Less Party Supply				16860943.02	
	Amount Payble to APDCL				52702.26	
				Say Rs.	52702.00	

(Rupees Fifty Two Thousand Seven Hundred Two Only)

Approved
CGM (D&S)
APDCL (LAR) Bijulee
Pathan Bazar, Guw

S/D
Junior Manager
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Sub-Divisional Engineer
Dudhnoi Electrical Sub-Division
APDCL (LAR), Dudhnoi, Goalpara

S/D
Assistant General Manager
Goalpara Electrical Division
APDCL, Bhalukdubi, Goalpara

Recommended by

PPdgu 13/9/22

Acct 13/09/2022

APPENDIX-X

Govt of Assam
Office of the Range Forest officer:: Rangjuli Range
Rangjuli

DIVISIONAL FOREST OFFICER GOALPARA DIVISION
No. 3332
Date 14/9/22

Memo no RR/44/N.H.217/565 - dt. 13/9/22

To

The Divisional Forest officer
Goalpara Division, Goalpara.

Sub:- Joint varification & enumeration thereof.
Ref:- your no nil dt 15.7.22

Sir

With reference cited above I have the honour to submit herewith the enumeration list alongwith sawing Govt valuation of standing tree on the road side of Dudhnoi Dainadubi market to falling of tree for widening to 2 lane road.

This is for favour of your kind information & necessary action.

Enclo
(1) Enumeration list
(2) Govt valuation
----x--

Yours faithfully.

Range Forest Officer
Rangjuli, Range

APPENDIX-X

Details Valuation of Standing tree at Dudhnoi to Dainadubi Road Side under Rangjuli Range, Rangjuli.

Jarup	Below girth				Up girth				Grand Total Valuation (5+9)	Remarks
	Nos of Tree	Volume Standing	Rate	Valuation	Nos of Tree	Volume Standing	Rate	Valuation		
	2	3	4	5	6	7	@ 8	9	10	
A I	15 Nos	2·516 m^3	@ 600/-	15,111/-	9 Nos	11.670 m^3	@ 9828/-	124693/-	1,29,804/-	
A II	4 Nos	1·298 m^3	@ 4604/-	5,976/-	10 Nos	21·737 m^3	@ 6396/-	139030/-	1,45,006/-	
B I	125 Nos	25·800 m^3	@ 2403/-	61997/-	9 Nos	10·547 m^3	@ 3998/-	42,167/-	1,04,164/-	
B II	15 Nos	1·914 m^3	@ 1346/-	2,576/-	5 Nos	9·173 m^3	@ 2018/-	18,511/-	21,087/-	
C	94 Nos	25·234 m^3	@ 843/-	21,272/-	11 Nos	22·582 m^3	@ 1202/-	27,143/-	48,415/-	
D	42 Nos	4·515 m^3	@ 410/-	1,851/-	—	—	—	—	1,851/-	
E	177 Nos	29·985 m^3	@ 273/-	8,186/-	54 Nos	9·185 m^3	@ 410/-	3766/-	11,952/-	
									Rs 4,62,279/-	

Submitted

Range Forest Officer
Rangjuli, Range

APPENDIX-X

Details comparative Statement of the Enumeration trees.

Species	30-60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300	Above	
Sura	10	15	11	1	1						32
Gross	28	3	2								33
Teak	12	1	2	7		2					24
Jiea		1	2			1					4
Mala	4										4
Pama	2	2									4
Sal			1			3	2	1	1	1	9
R.Sura	6	8	8	8	2	1	2	1	5		41
AKSaiya	1										1
Barpat				1							1
Neem	2		5	1	2			1	1	1	13
Jamu		2	2	3							7
Satiana	6	4	1	2	1		1				15
Muga	6										6
Cacesium	22	20	14	10	6	1					73
Bhalkar	20	27	10		1	1					59
Bogari	21	7									28
Agaru	6										6
Sonaro	67	19									86
Ajar	14	12	2			1			1	1	31
Glomary		3		1	1						5
Eucalyptus		4	8	3	5						20
palash	2	3									5
Dudhkuri	14	4									18
Bohera					1						1
Sawra	4	3									7
Amara		1									1
pakari			2		1				5		8
Dabadaru			2								2
Kathal		1									1
Moder	1										1
Kadam		1					1				2
Bakul	1			1							1
Haldo											1
Arjun		1									1
Mango			1								1
Mog		1									1
Simalo		3	1	1		1					6
Koroi		3			1				1		5
	249	149	74	39	21	11	6	3	14	3	570

17/8/2022
Rahul Soni
Consultant NHIDCL
Global infra solutions.

Submitted
Sri Kumar Chandan

APPENDIX-XI

Zonal Value approved by the Govt. Vide letter No. REGN 120/2021/239 Dt. 29.12.2021

Format for Submission of Revised Zonal Land Valuation

Circle :- Dudhnoi, Goalpara

	0	Rate of Trade Site & percentage of increase					Rate of Residential & percentage of Increase				Rate of Others & percentage of increase						
Sl. No.	Name of Revenue Village	Special Trade Site	1st Class	2nd Class	3rd Class	Near PWD/N.H	1st Class	2nd Class	3rd Class	Near PWD/N.H	Salitoli	Foringoti	Jalatok	Lahitoli	ear PWD/N.H	Any other Category	Remarks
1	Dudhnoi Rajah Chahar Pt-I	NA	4000000 (14.26%)	3000000 (0%)	2500000 (13.64%)	NA	2500000 (13.64%)	2000000 (11.11%)	1500000 (7.14%)	NA	400000 (33.33%)	900000 (20%)	200000 (33.33%)	NA	800000 (Salitoli) (33.33%)	800000 (Rajah Chahar) (33.33%)	Increase in market value and value of registered deed
2	Dudhnoi Rajah Chahar Pt-II	NA	4000000 (14.26%)	3000000 (0%)	2500000 (13.64%)	NA	2500000 (13.64%)	2000000 (11.11%)	1500000 (7.14%)	NA	400000 (33.33%)	900000 (20%)	200000 (33.33%)	NA	800000 (Salitoli) (33.33%)	800000 (Rajah Chahar) (33.33%)	Increase in market value and value of registered deed
3	Dudhnoi Rajah Chahar Pt-III	NA	3500000 (16.67%)	3000000 (25%)	2200000 (22.22%)	NA	2200000 22.22%)	1700000 (21.43%)	1400000 (40%)	NA	300000 (50%)	1000000 (33.33%)	300000 (100%)	NA	500000 (Salitoli) (66.67%)	400000 (Rajah Chahar) (60%)	Increase in market value and value of registered deed
4	Bandarshi Pt-I	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
5	Bandarshi Pt-II	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
6	Bandarshi Pt-III	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
7	Barpathar	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
8	Mowamari	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
9	Bormatia Pt-I	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed

Additional Deputy Commissioner
Goalpara

APPENDIX-XI

10	Bormatia Pt-II	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
11	Rombouk	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
12	Guwabari Mondalgram Hills	NA	NA	600000 (33.33%)	NA	NA	300000 (33.3%)	NA	NA	800000 (6.67%)	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
13	Lela	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
14	Khara Pt-I	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
15	Khara Pt-II	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
16	Khara Medhipara	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
17	Bajemondal Sialmari	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
18	Lakheraj Mondalgram Pt-I	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
19	Lakheraj Mondalgram Pt-II	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
20	Rowmari	NA	NA	NA	NA	NA	600000	300000 (20%)	1000000	NA	150000 (25%)	180000 (20%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
21	Dighali	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
22	Habanggiri	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed

Additional Deputy Commissioner
Goalpara

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23	Damra Patpara	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
24	Nokmakundi	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
25	Bagulamari	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
26	Nishangram	NA	NA	600000 (33.33%)	NA	NA	NA	300000 (33.33%)	NA	950000 (20%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
27	Nobagram	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
28	Fafal	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
29	Tangabari	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
30	Latapara	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
31	Darakhpara	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
32	Charaimari	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed

Additional Deputy Commissioner
Goalpara

APPENDIX-XI

33	Chiluk Part-I	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
34	Chiluk Part-II	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
35	Puranibhita	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
36	Chuchia	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
37	Kharabagaribari	NA	NA	700000 (16.67%)	NA	1300000 (Trade Site) (8.33%)	NA	500000 (25%)	NA	900000 12.5%)	220000 (10%)	350000 (16.67%)	200000 (33.33%)	NA	700000 (Salitoli) (16.66%)	NA	Increase in market value and value of registered deed
38	Melopara Pt-I	NA	NA	400000 (11.11%)	NA	650000 (Trade Site) (8.33%)	250000 (11.11%)	NA	NA	700000 (16.67%)	150000 (25%)	150000 (0%)	120000 (0%)	NA	400000 (Salitoli) (11.11)	NA	Increase in market value and value of registered deed
39	Patpara Pt-I	NA	NA	400000 (11.11%)	NA	650000 (Trade Site) (8.33%)	250000 (11.11%)	NA	NA	700000 (16.67%)	150000 (25%)	150000 (0%)	120000 (0%)	NA	400000 (Salitoli) (11.11)	NA	Increase in market value and value of registered deed
40	Patpara Pt-II	NA	NA	400000 (11.11%)	NA	650000 (Trade Site) (8.33%)	250000 (11.11%)	NA	NA	700000 (16.67%)	150000 (25%)	150000 (0%)	120000 (0%)	NA	400000 (Salitoli) (11.11)	NA	Increase in market value and value of registered deed
41	Santipur	NA	NA	400000 (11.11%)	NA	700000 (Trade Site) (16.67%)	NA	230000 (2.22%)	NA	700000 16.67%)	150000 (25%)	180000 (20%)	120000 (20%)	NA	400000 (Salitoli) (11.11)	NA	Increase in market value and value of registered deed
42	Manupara	NA	NA	550000 (22.22%)	NA	900000 (Trade Site) (20%)	NA	200000 (33.33%)	NA	900000 (20%)	100000 (25%)	120000 (20%)	100000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed

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43	Kacharipara	NA	NA	550000 (22.22%)	NA	900000 (Trade Site) (20%)	NA	200000 (33.33%)	NA	900000 (20%)	100000 (25%)	120000 (20%)	100000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
44	Prithupara	NA	NA	550000 (22.22%)	NA	900000 (Trade Site) (20%)	NA	200000 (33.33%)	NA	900000 (20%)	100000 (25%)	120000 (20%)	100000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
45	Tarapara	NA	NA	3000000 (100%)	NA	3500000 (Trade Site) (75%)	NA	700000 (40%)	NA	1500000 (50%)	150000 (25%)	200000 (33.33%)	100000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
46	Jkhowapara	NA	NA	500000 (11.11%)	NA	600000 (Trade Site) (20%)	NA	250000 (11.11%)	NA	550000 (10%)	150000 (25%)	200000 (33.33%)	100000 (25%)	NA	400000 (Salitoli) (33.33%)	NA	Increase in market value and value of registered deed
47	Chituk	NA	NA	500000 (11.11%)	NA	800000 (Trade Site) (6.67%)	NA	250000 (11.11%)	NA	800000 (6.67%)	150000 (25%)	250000 (25%)	150000 (25%)	NA	500000 (Salitoli) (11.11%)	NA	Increase in market value and value of registered deed
48	Deoulgun Pt I	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed
49	Deoulguri Pt II	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed
50	Rongrongpara	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed
51	Kushdhuwa Chechapani Pt I	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed
52	Kushdhuwa Chechapani Pt II	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed

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53	Kushdhuwa Chechapani Pt III	NA	NA	400000 (11.11 %)	NA	700000 (Trade Site) (16.67%)	NA	200000 (11.11 %)	NA	650000 (8.33%)	120000 (20%)	NA	NA	NA	400000(Salitoli) 11.11%)	NA	Increase in market value and value of registered deed
54	Kushdhuwapara Pt I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
55	Kushdhuwapara Pt II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
56	Nalbari	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
57	Rongpathar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
58	Chuchia Pahar Pt I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
59	Chuchia Pahar Pt II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
60	Rowmari Pt II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
61	Melopara Pt II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
62	Gadimpathar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
63	Hajaripara	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
64	Moishkhuli Para	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed

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65	Moishkhuli Khamar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
66	Chouka Kata	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed
67	Kanyakushi Pahar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	150000 (25%)	125000 (25%)	NA	NA	NA	Increase in market value and value of registered deed

Circle Officer
Dudhnoi Rev Circle
Dudhnoi

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Goalpara