Consultancy Services for Carrying out Feasibility Study, Preparation of Detailed Project Report and providing pre-construction services in respect of 2 laning of Maram-Peren- Dimapur section on NH 129A (Manipur & Nagaland) on Engineering, Procurement and Construction mode in the state of Manipur & Nagaland. (Package No. NHIDCL/DPR/SN-DMP-PC/Manipur/2016)

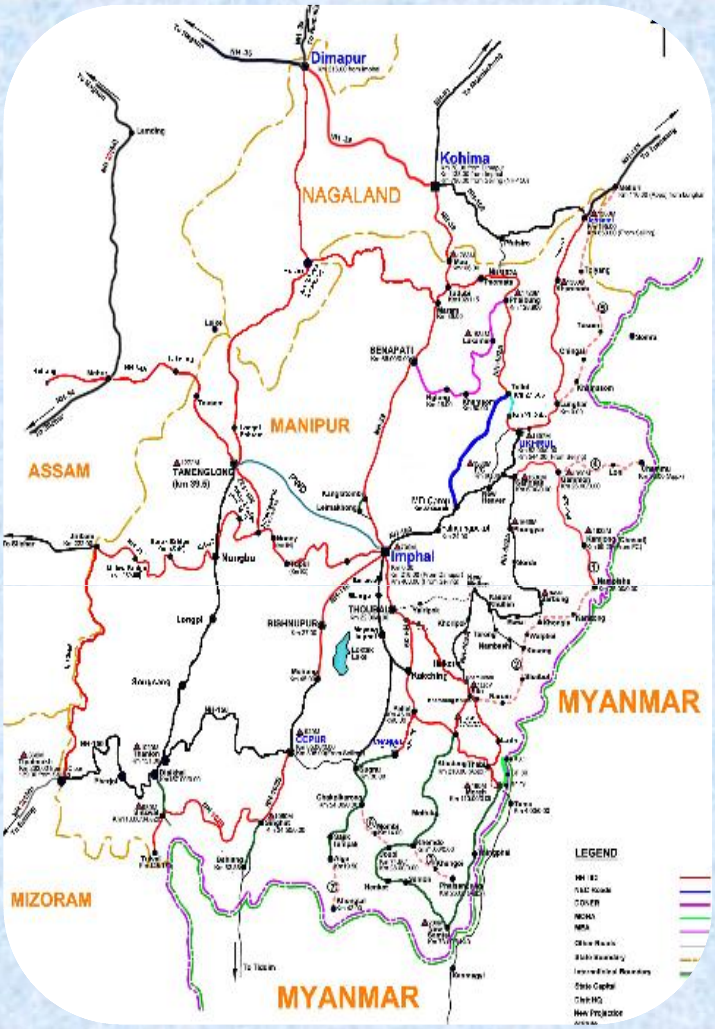
MUCK DISPOSAL REPORT

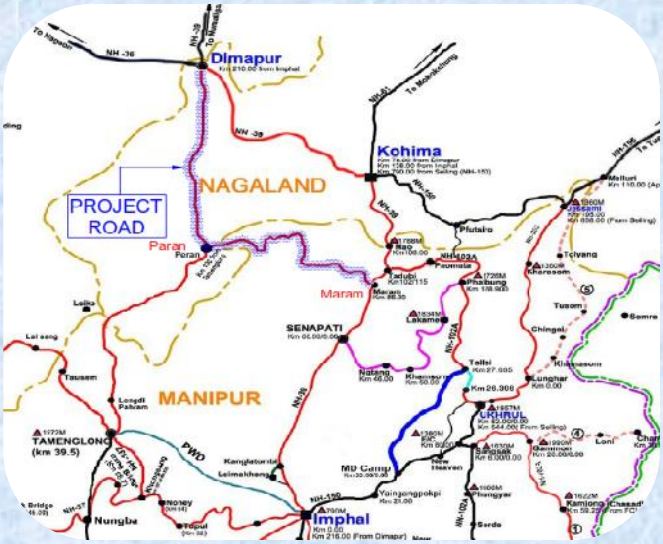
(Peren-Dimapur Section in the State of Nagaland)

• PKG-I: KM 109+494 TO KM 126+775

National Highways & Infrastructure Development Corporation Ltd.

PTI Building, 3rd Floor, 4,Parliament Street, New Delhi-110001





C. E. Testing Company Pvt. Ltd.

124-A, NSC Bose Road, Kolkata -700092

CET/4046/NHIDCL/NH-129A/MDR Rev: R0 SEPTEMBER, 2021

Contents

MUCK DISPOSAL REPORT

1.1 Introduction

National Highways and Infrastructure Development Corporation (NHIDCL) is a fully owned company of the Ministry of Road Transport & Highways (MoRT&H), Government of India. The company promotes, surveys, establishes, design, build, operate, maintain and upgrade National Highways and Strategic Roads including interconnecting roads in parts of the country which share international boundaries with neighboring countries. The regional connectivity so enhanced would promote cross border trade and commerce and help safeguard India's international borders. This would lead to the formation of a more integrated and economically consolidated South and South East Asia. In addition, there would be overall economic benefits for the local population and help integrate the peripheral areas with the mainstream in a more robust manner.

As a part of the above mentioned endeavor, National Highways & Infrastructure Development Corporation Limited (NHIDCL) has been entrusted with the assignment of Consultancy Services for Carrying out Feasibility Study, Preparation of Detailed Project Report and providing pre-construction services in respect of 2 laning of Peren-Dimapur road Section of NH-129A on Engineering, Procurement and Construction mode in the state of Nagaland.

National Highways & Infrastructure Development Corporation Ltd. is the employer and executing agency for the consultancy services and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule.

National Highways & Infrastructure Development Corporation Limited (NHIDCL), MoRT&H, New Delhi has appointed C.E. Testing Company Pvt. Ltd. (CETEST) as consultant to prepare the Detailed Project Report for the above road stretches vide Letter of Acceptance No. NHIDCL/DPR/SN-DMP-PC/MANIPUR/2016/Vol-II/390 dated 26.10.2017.

1.2 Project Background

The project road starts from existing Ch. 109.767km [Dzuko Bridge (Manipur & Nagaland State border) near Peren town] under Peren district and ends at existing Ch. 190.896km(7th Mile junction with NH-39 in Chumukhdima Town) under Dimapur district.

The project road is located in mountainous & steep terrain. The entire road passes through Peren town, Old Jalukie Sector A, Old Jalukie Sector B, Old Jalukie Sector C, Jalukie B, Jalukie town, Nkwakreu village, New Jalukie, Mhainamsti village, Kiyevi village, Heningkunglwa village, Ngwalwa Village, Chumukedima village, Chumukedima 'A' village, Virazouma village, Tenyiphe-II village and Chumukedima town.

The project road has been divided into five packages. Details are summarized in below table 1.1.

Table 1.1: Package Details

Package No	Existing Chainage (Km)		Existing Length (KM)	Design Chainage (Km)		Design Length (KM)
	From	To		From	To	
PKG-I	109+767	125+203	15.436	109+494	126+775	17.281
PKG-II	125+203	145+393	20.190	126+775	146+208	19.433
PKG-III	145+393	162+890	17.497	146+208	163+592	17.384
PKG-IV	162+890	173+850	10.960	163+592	173+850	10.258
PKG-V	173+850	190+896	17.046	173+850	190+850	17.000
	Total existing length		**81.129**	**Total design length**		**81.356**

In context of the above mentioned table 1.1, Package-I start from Km 109+494 to Km 126+775 (Length 17.281 Km) on at NH-129A in the district of Peren in the state of Nagaland has been proposed 2-Lane configuration as per specification.

The consultancy services for the same is to include design of best possible alignment follow the existing alignment in addition to Financial Analysis of costs, prioritization of this road depending on project viability and anticipation of hazards during construction, preparation of Land Acquisition Plan, if required and obtaining of all requisite clearances.

Geo Reference Map of the project road stretch is enclosed in Figure 1.1

View of existing Road condition along proposed alignment

	
Origin Point at Dzuko Bridge	**Peren Town**

1.3 Salient Features of the Project Road (Package-I)

Sl. No	Descriptions		Existing	Proposed
1	Start Point		Starts from Ext. Ch. 109.767km [Dzuko bridge (Manipur & Nagaland state border) near Peren town]	Starts from Ext. Ch. 109.494km [Dzuko bridge (Manipur & Nagaland state border) near Peren town]
2	End Point		Ends at Ext. Ch. 125.203km	Ends at Design Ch. 126.775km
3	Length	:	Existing Length = 15.436 Km (As per topographic survey)	Proposed Design Length =17.281 Km
4	Terrain	:	**Mountainous Terrain**	**Mountainous Terrain**
5	Horizontal Alignment	:	The horizontal alignment of the existing road has many sub-standard and sharp curves including reverse S-curves. There is also deficiency in transition length as per MoRT&H standards. The details are given below –	Horizontal curves including the sharp/blind curves as well as zigzag ones has been improved to achieve required design speed and super elevation reversal for riding safety and comfort in conformation to MoRT&H standards.
6	Design Speed	:	Avg. 20-40 kmph	**Design Speed:** 60 - 40 kmph in general. However as per site constraint design speed is reduced up to 20 kmph.
7	Cross-Section	:		**(1) In Semi Built Up Area at Plain/Mountainous Terrain** Carriageway = 7.0 m Hard Shoulder = 2 x 1.5m Footpath cum Covered Drain/Utility Corridor

Types of Curves	**From (km)**	**To (km)**
Sharp Curves/ Blind Curves	Package-I	
	118+190	125+203
Hair-Pin Bends	Package-I	
	109+767	117+940
	123+690	125+203

Chainage (km)		**Average Carriageway Width (m)**
From	**To**	
Package-I		
109.494	125.203	3.5 - 5.0

Sl. No	Descriptions		Existing	Proposed
			Earthen Shoulder/Gravel Shoulder: 1.0m – 3.5m **Total Formation Width:**5.5m – 11.0m	= 2 x 1.0m Space for Utility Corridor = 2 x 1.0m ***Total Roadway Width = 12.0m*** **(2) In Congested Built up Area at plain terrain** Carriageway = 7.5 m Footpath cum Covered Drain = 2 x 1.0 m Space for Utility Corridor = 2 x 1.25 m ***Total Roadway Width = 9.5 m*** **(3) In Rural/Open Area at Plain Terrain** Carriageway = 7.0m Hard Shoulder = 2 x 1.5m Earthen Shoulder = 2 x 1.0m ***Total Roadway Width = 12.00m*** **(4) In Rural/Open Area at Mountainous Terrain without Retaining Wall on Valley Side** Carriageway = 7.0m Hard Shoulder = 2 x 1.5m Earthen Shoulder = 1 x 1.0m ***Total Road Width = 11.00m*** **(5) In Rural/Open Area at Mountainous Terrain with Retaining Wall on Valley Side** Carriageway = 7.0m Hard Shoulder = 2 x 1.5 m ***Total Road Width = 10.00m***
8	CBR Considered	:	-	10%
9	Traffic (January, 2018)	:	**<u>For Homogenous section – II</u>** Base year Traffic (Yr. 2019) Total Vehicle in numbers=373 nos. Total Vehicles in PCU = 322 PCU Total CVPD = 4 nos. **<u>For Homogenous section – III</u>** Base year Traffic (Yr. 2019) Total Vehicle in numbers=3304 nos. Total Vehicles in PCU = 2938 PCU Total CVPD = 217 nos.	**<u>For Homogenous section – II</u>** Projected Traffic (Yr. 2042) Total Vehicle in numbers=1966 nos. Total Vehicles in PCU = 1701 PCU Total CVPD = 22 nos. **<u>For Homogenous section – III</u>** Projected Traffic (Yr. 2042) Total Vehicle in numbers= 17437 nos. Total Vehicles in PCU = 15504 PCU Total CVPD =1146 nos.
10	Traffic Growth Rate	:	-	7.5 % growth of traffic is considered
11	Pavement Design Life	:	-	Flexible Pavement - 20 Years
12	Design msa	:	-	**For Homogenous section – II** (Ext. Ch. 115+280 km to Ch. 141+690 km) : **Calculated MSA = 0.06 MSA** **For Homogenous section – III** (Ext. Ch. 141+690 km to Ch. 178+937 km) : **Calculated MSA = 3 MSA**

Sl. No	Descriptions		Existing	Proposed
				Adopted MSA = 20 MSA as per IRC:SP:73-2015 clause no. 5.4.1
13	Flexible Pavement Thickness	:	Bituminous Surface = 10 – 30 mm Stone Aggregate + Sand = 200 – 720 mm Total Pavement Thickness = 210– 750 mm	**For New/Widening & Strengthening portion:** BC = 40mm DBM = 70mm WMM = 250mm GSB = 200mm **Total = 560mm**
14	Bridges	:	**Package-I** Nil	**Package-I** Nil
15	Culverts	:	**Package : I** Total Culvert = 49 nos. • Pipe Culverts = 42 nos. • Slab Culverts = 7 nos.	**Package : I** Reconstruction with Box culverts=32 nos. New Box culverts =7 nos.
16	ROB	:	Nil	**Package-I** Nil
17	Protection Work	:	-	**Package – I** Total length of Retaining Wall=5500 m • Length of 1.5m Retaining Wall=250m • Length of 2.0m Retaining Wall=1200m • Length of 3.0m Retaining Wall=2750m • Length of 4.0m Retaining Wall=1300m Length of Breast Wall = 6850 m Metal Beam Crash Barrier = 2888 m Length of composite RE Wall=250m Hydro seeding=50800Sq m
18	Longitudinal Drains	:	-	**Package – I** Length of RCC Cover Drain = 4584 m Length of RR Masonry Trapezoidal Drain = 13779.46 m
19	Bus Bay with Passenger Shelter	:	Nil	Total 6 nos. bus bay are proposed at 3 nos. locations. Package wise details are given below:
20	Truck Lay Bye	:	Nil	Nil
21	ROW	:	5.0m to 14.0m	Open Area = 18m - 24m Semi Built-up Area = 14m Congested Built-up Area = 12m
22	Land Details	:	**Package : I** Available land is 27 Ha. (Approx.)	**Package : I** Land to be acquired 26.77 Ha. (Approx)

Sl. No	Chainage (km)	Name of the habitation	Side
Package-I			
1	114.15	Peren Town	Both
2	121.29	Old Jalukie Sec A	Both
3	124.54	Old Jalukie Sec B	Both

<table>
<tr><th>Sl. No</th><th>Descriptions</th><th></th><th>Existing</th><th>Proposed</th></tr>
<tr><td>23</td><td>Forest Stretch</td><td>:</td><td colspan="2">Peren District – Alignment Passes through forest land at Peren Range with roadside plantation.</td></tr>
<tr><td>24</td><td>Major Intersection</td><td>:</td><td>3Nos. (All junctions are 3-legged)
<table><tr><th>Sl. No.</th><th>Existing Chainage (Km)</th><th>Name of Junction</th><th>Leads To</th></tr><tr><td colspan="4">Package-I</td></tr><tr><td>1</td><td>119.000</td><td>Kiepeuzang</td><td>Tenning</td></tr><tr><td>2</td><td>119.560</td><td>Peren town</td><td>Peren Town</td></tr><tr><td>3</td><td>124.250</td><td>Pelekie</td><td>Kohima</td></tr></table></td><td>3 Nos. of Major Intersections will be improved at grade.<table><tr><th rowspan="2">Sl. No.</th><th colspan="2">Proposal</th></tr><tr><th>Design Chainage (Km)</th><th>Type</th></tr><tr><td colspan="3">Package - I</td></tr><tr><td>1</td><td>120.900</td><td>At Grade 3-Legged</td></tr><tr><td>2</td><td>121.400</td><td>At Grade 3-Legged</td></tr><tr><td>3</td><td>125.870</td><td>At Grade 3-Legged</td></tr></table></td></tr>
<tr><td>25</td><td>Minor Intersection</td><td>:</td><td><u>Package: I</u>
11 nos.</td><td><u>Package: I</u>
11 nos.</td></tr>
<tr><td>26</td><td>Realignment</td><td>:</td><td>Nil</td><td><u>Package: I</u>
Total Length = 6.722 km
• Major Realignment due to vertical grade correction = 6.622 km (from Ch. 109 + 494 to Ch. 116+116).
• Minor Realignment- 1 Location of total length 0.100 km.</td></tr>
<tr><td>27</td><td>Bypass</td><td>:</td><td>Nil</td><td>Nil</td></tr>
<tr><td>28</td><td>Flyover</td><td>:</td><td>Nil</td><td>Nil</td></tr>
<tr><td>29</td><td>Underpasses (VUP/LVUP/PUP)</td><td>:</td><td>Nil</td><td>Nil</td></tr>
<tr><td>30</td><td>Service Road</td><td>:</td><td>Nil</td><td>Nil</td></tr>
<tr><td>31</td><td>Toll Plaza</td><td>:</td><td>Nil</td><td>Nil</td></tr>
<tr><td>32</td><td>Total Civil Cost(Including Escalation based on WPI @ 3.40% for 4 year) (Rs.)</td><td>:</td><td>-</td><td><u>Package: I</u>
Rs. 212.26 Cr. (Rs. 12.28 Cr. / Km)</td></tr>
</table>

1.4 Quantity of Muck Generated and its consumptive use

During Construction of different components of the project, muck is generated both from soil or slide material and from rock excavation. Total quantity of muck/debris generated due to the project, shall be **11081.00** cum which shall amount to **14405.30** cum considering 30% swell factor. Out of the total muck generated, **2139.00** cum shall be utilized on project road for filling purpose and remaining **12266.30** cum to be dumped with 20% compaction at designated sites. The muck shall be properly roller compacted and dumped on sites to match with the surrounding environment with least change in landscape. Abstract of muck generated and its disposal is presented in **Table 1.1**

Table 1.1: Abstract of Muck Generated and its Disposal

Sl. No.	Quantity of Muck / Debris generated	Quantity of Muck with 30% swell factor	Total Quantity of Muck / Debris including swell factor	Estimated Quantity of Muck/Debris proposed to be utilized in Filling	Balance quantity of muck /debris proposed to be dumped	Effective Muck to be Dumped (With 20% compaction)	Name of the Dumping Site
	(Cum)	(Cum)	(Cum)	(Cum)	(Cum)	(cum)	
1	11081.00	3324.30	14405.30	2139.00	12266.30	9813.04	Muck Disposal Area 1
Total	**11081.00**	**3324.30**	**14405.30**	**2139.00**	**12266.30**	**9813.04**	

1.5 Selection of Muck Disposal Site

The selection of muck disposal sites was carried out considering the quantity of muck, landscape, cost effectiveness, nearness to source of generation, absence of ground and surface water, relief and scope of afforestation works. Subsequently the spoil tips (muck disposal sites) will be developed by taking up plantation through bio technological methods to generate forest type canopy over them. The dumping location shall be well supported at base and at higher elevation by suitable retaining structures like Gabion Wall. Details of Dumping site and amount of muck to be disposed has been summarized in **Table 1.2.**

Table 1.2: Details of Muck Disposal Site

Sl. No.	Name of Dumping Site	Location of Dumping Site	Dumping Area (sqm)	Average Dumping Height (m)	Volume of Muck to be Dumped (with 20% Compaction) (Cum)
1	Muck Disposal Area 1	NEAR PEREN TOWN (Valley Side)	3,400.00	36.00	9813.04
		Total	**3,400**	**36.00**	**9813.04**

The layout Plan of Muck disposal Site is shown in **Fig 1.2.**

1.6 Description of Muck Disposal Sites

The proposed muck disposal site is located nearest valley side from the existing road. The details are given below.

MUCK ID - 01	LATITUDE(N)	LONGITUDE(E)	Side of Nearest Valley from Existing Road
M1	25°32'05.599"	93°45'25.212"	Right Hand Side (Existing Ch. 112.375km /Proposed Ch. 113.600km)
M2	25°32'07.686"	93°45'25.210"	
M3	25°32'07.703"	93°45'23.430"	
M4	25°32'05.641"	93°45'23.385"	

The Plan area of the site is 3400 Sq. m. = 0.34 Ha.

1.7 Implementation of Engineering Measures at Muck Disposal Site

It has been observed that after disposal of muck, it creates problem as it is susceptible to scattering unless the muck disposal sites are supported with Gabions. All the dumping sites need proper handling to avoid spilling of muck into the river water, present of settlement in valley side while dumping and in the post dumping stages. The muck disposal site has to be developed from the ground level by providing gabion structure. The costing of engineering measures has been worked out based on gabion structure. In the muck disposing site, muck brought in dumpers shall be dumped and manually spread behind the crates and compacted with the roller in such a manner that rock mass is properly stacked behind the crates with minimum of voids.

1.8 Implementation of Biological Measures at Muck Disposal Site

Biological measures, however, require special efforts as the disposed muck will be devoid of nutrients and soil contents to support vegetation. The selection of soil for spreading over such an area would require nutrient profiling of soil for different base elements. Suitable mixtures of nutrients would be done before placing the soil on the top surface of muck disposal area to have administrative growth of forest canopy.

1.8.1 Plantation Technique

In view of the site condition, particularly the soil condition, the planting technique for all the categories of the plants has to be very site specific and suited to the stress conditions as anticipated and discussed above. The planting substrates would need to be considerably improved to support the plants in their initial stages of establishment. The moisture retention capability, availability of nutrients and soil aeration, permeability and porosity would require intervention and assistance.

Plantations are proposed to be raised on the muck dumping sites using grass carpeting in the under storey and trees in the upper story. Tree species would be planted in the area combined with grass showing in patches. Intimate mixture of species would be avoided right at the planning stage and would be strictly followed during planting. Grass carpeting would be mixed by groups in rows.

Grass slip planting and grass seed sowing would be done in strips at 0.1 m x 0.1 m spacing in prepared staggered patches of 1 m x 0.5 m with a depth of 0.3 m. Soil mixture would be used while filling the patches.

Planting trees as compensatory afforestation at the rate of 290 nos. trees per hectare at a spacing of 6m by grubbing and leveling the ground up to a depth of 150mm, digging holes 0.9m dia., 1m deep,

mixing farm yard/sludge manure with soil, planting of sapling 2 m high with 25 cm diameter stem, backfilling the hole and watering.

The stabilization sites from the time of execution of biological measures would be protected with barbed wire fencing on 1.65 m high RCC posts and provided with inspection paths.

The plantations under biological measures would be maintained for a period of one year by watering the plantation during dry season, mortality replacement and repair of fencing and inspection paths within the area. The proposed costs include raising plants, grass carpeting and also for mortality replacement.

1.8.2 Species for Plantation

Afforestation with suitable plant species of high ecological and economic value and adaptable to local conditions will be undertaken in accordance with canopy cover requirement. Selection of plant species, propagation and cultivation will be done in co-ordination with Concerned Forest Department in Nagaland.

1.9 Budget for Muck Disposal Plan

Estimation has been made for engineering measures of muck disposal plan as **Rs. 0.76 Cr.** whereas biological measures as **Rs. 0.06 Cr.** Thus, Total budget for Muck Disposal Plan has been estimated as **Rs. 0.82 Cr.**

The cost break-up of engineering and biological measures are detailed in **Table 1.3** and **Table 1.4** respectively.

Table 1.3: Cost Estimate for Engineering Measures

Sl. No.	SOR Item No.	Name of the work	Unit	Qty	Rate	Amount (Rs. Lakhs)
Muck Disposal Site						
1		**Gabion Wall Construction**				
	12.1 I B (i)	Earth Work	Cum	129.6	75.00	0.10
	12.8 A (I)	PCC M15	Cum	21.6	10094.95	2.18
	12.7	Stone Masonry	Cum	324	8648.63	28.02
2	3.11	Removal of unserviceable soil from excavation to muck disposal site (for extra lead above 1km upto 12Km)	Cum	9813.00	394.00	38.66
		Total quantity of Muck	Cum	**9813**		
					Sub-Total (1+2) =	**68.96**
					Contingencies @ 10%=	**6.90**
					Total =	**75.86**

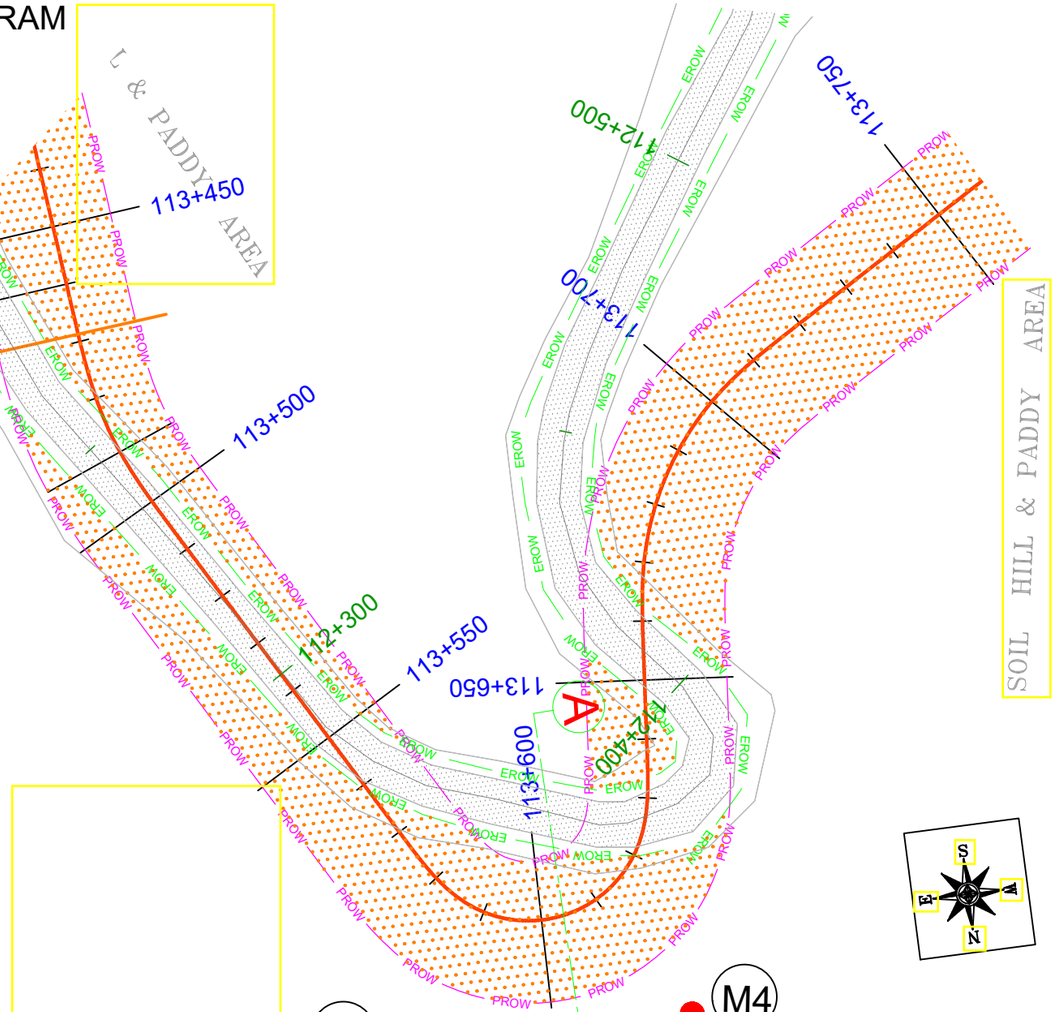
Table 1.4: Cost Estimate for Biological Measures

Sl. No.	SOR Item No.	Name of the work	Unit	Qty	Rate	Amount (Rs. Lakhs)
1		Raising of Plantation (Creation Cost)				
	LS	Survey / demarcation / plantation /site clearance	Days	2	450	0.009
	11.21	Compensatory afforestation	Hectare	0.34	126431.00	0.43
2		**Fencing Cost**				
	8.17	G.I Barbed wire Fencing 1.2 metre high (Providing and fixing 1.2 metres high GI barbed wire fencing with 1.8 m angle iron posts 40 mm x 40 mm x 6 mm placed every 3 metres center to center	Meter	154	616.00	0.95
		ii) Maintenance of barbed wire fencing @5% of erection cost for 2nd and 3rd year				0.05
3	11.5	Turfing lawns with fine grassing	Sqm	3400	126.00	4.28
					Sub-Total (1+2+3) =	**5.72**
					Contingencies @ 10%=	**0.57**
					Total Cost for Biological Treatment=	**6.29**

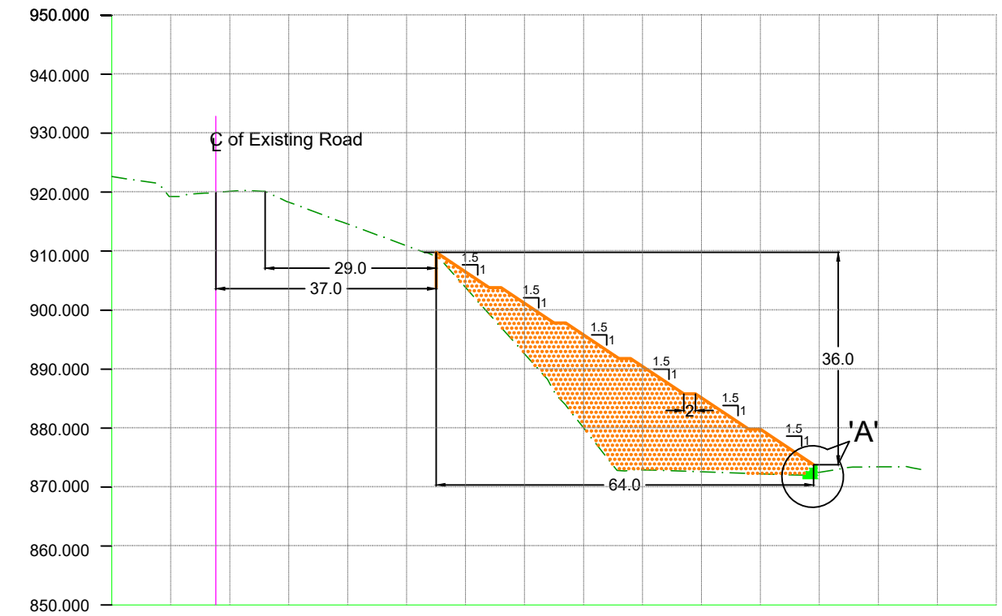
Total budget for Muck Disposal Plan = 82.15 Lakhs i.e. 0.82 Cr.

MARAM

DIMAPUR

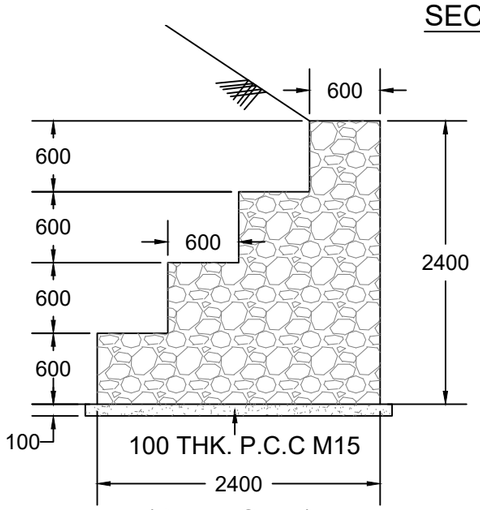


MUCK DISPOSAL PLAN



MUCK ID-01
AREA OF MUCK DISPOSAL- 0.34 Ha.
CAPACITY OF VOLUME - 9813.00 Cum.

SECTION A-A



(DETAILS - 'A')

DETAILS OF GABION WALL

MUCH DISPOSAL AREA: SURROUNDING COORDINATES		
Muck	Longitude (E)	Latitude (N)
M-1	25°32'05.599"	93°45'25.212"
M-2	25°32'07.686"	93°45'25.210"
M-3	25°32'07.703"	93°45'23.430"
M-4	25°32'05.641"	93°45'23.385"

FIG:-1.2

MKD.	DATE	DESCRIPTION	CHKD.	APPRD.

Modified as per Proposed Right of Way

Scale :- NTS

DATE: SEP,2021

CLIENT: NATIONAL HIGHWAYS AND INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
PTI Building, 3rd Floor, 4, Parliament Street, New Delhi - 110001

PROJECT: CONSULTANCY SERVICES FOR CARRYING OUT FEASIBILITY STUDY, PREPARATION OF DETAILED PROJECT REPORT AND PROVIDING PRE-CONSTRUCTION SERVICES IN RESPECT OF 2 LANING OF **PEREN- DIMAPUR SECTI**ON ON NH 129A ON ENGINEERING, PROCUREMENT AND CONSTRUCTION MODE IN THE STATE OF NAGALAND.

LAYOUT PLAN OF MUCK DISPOSAL SITE

CONSULTANT : CETEST Engineering Consultants — An ISO 9001, 14001 & OHSAS 18001 Certified Company
CE TESTING COM 'D.
124-A, N.S.C
Kolkata

DWG NO :- CET/4046/NHIDCL/NH-129A/P-D/MDP

REVISION MKD. - R0		SHEET NO. - 01	
DRAWN BY	DESIGNED BY	CHECKED BY	ISSUED BY
S.MANDAL	B.DAS	S.SADHU	P.KONER

ANNEXURE-I: FOREST NO OBJECTION CERTIFICATE

C.E. TESTING CO. PVT. LTD. KOLKATA 700 092 124A, N.S.C. BOSE ROAD

FOREST NO OBJECTION CERTIFICATE

Project Name :- Construction of 2-Laning with Hard Shoulder of Peren-Dimapur Section on NH-129A from Design Km 109.494 to Km 126.775 (Length -17.281 Km) in the state of Nagaland on EPC Mode (Package-1) under NH(O)-TSP

Village Name :- Peren			Date :-	
Chainage	Existing Chainage		Design Chainage	
	From	To	From	To
	112.333 Km	112.403 Km	113.570 Km	113.640 Km

(Note :- NHIDCL will not give any compensation for the Muck Disposal Site to the local land owner.The Site will be given back after dumping the surplus material by the NHIDCL's contractor with necessary land development.)

Name of the DFO	Forest Division	Signature with date and Seal
M. OBED ZELIANG.	PEREN FOREST DIVISION	22/9/21 Divisional Forest Officer Peren Forest Division Jalukie : Nagaland
Name of the Land Owner		Signature with date and Seal
MIREULUNG SEPHE		22/09/21 Chairman Peren Village Council Peren : Nagaland