FINAL ENVIRONMENT ASSESSMENT REPORT (FEAR) FOR

T & D NETWORK IN KAMRUP METRO DISTRICT UNDER NERPSIP TRANCHE-1, ASSAM

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Prepared for:

Power Grid Corporation of India Limited

Prepared by:

R S Envirolink Technologies Pvt. Ltd.

402, BESTECH CHAMBER,

B-BLOCK, SUSHANT LOK-I, GURGAON

Phone: +91-124-4295383: www.rstechnologies.co.in

ABBREVIATIONS

AEGCL	-	Assam Electricity Grid Corporation Limited
APDCL	-	Assam Power Distribution Company Limited
CA	-	Compensatory Afforestation
CBIS	-	Capacity Building and Institutional Strengthening
CEA	-	Central Electricity Authority
CFC	-	Chlorofluorocarbon
CPIU	-	Central Project Implementation Unit
CPR	-	Common Property Resources
CRM	-	Contractor's Review Meeting
DC	-	Deputy Collector
DL	-	Distribution Line
DPR	-	Detailed Project Report
EMF	-	Electro Magnetic Field
EMP	-	Environment Management Plan
EPA	-	Environment Protection Act
ESMU	-	Environment and Social Management Unit
ESPPF	-	Environment and Social Policy & Procedures Framework
FEAR	-	Final Environment Assessment Report
FSI	-	Forest Survey of India
GBPP	-	Gas Based Power Project
GA	-	Geographical Area
GCC	-	General Conditions of Contract
GHG	-	Green House Gas
GIS	-	Geographical Information System
GoA	-	Government of Assam
GoI	-	Government of India
GPS	-	Global Positioning System
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redressal Mechanism
GW	-	Green Wash
HEP	-	Hydro Electric Project
HFL	-	High Flood Level
HQ	-	Head Quarter
IBRD	-	International Bank for Reconstruction and Development
IA	-	Implementing Agency
ICNIRP	-	International Commission on Non-Ionizing Radiation Protection
IEAR	-	Initial Environment Assessment Report
ISFR	-	India State of Forest Report
Km	-	Kilometer
kV	-	KiloVolt

MDF	-	Moderately Dense Forest
MoEF&CC	-	Ministry of Environment Forest & Climate Change
MVA	-	Mega Volt Ampere
MW	-	MegaWatt
NEEPCO	-	North Eastern Electric Power Corporation Limited
NER	-	North East Region
NERPSIP	-	North Eastern Region Power System Improvement Project
NH	-	National Highway
NPV	-	Net Present Value
OF	-	Open Forest
PCB	-	Poly Chlorinated Biphenyl
PF	-	Protected Forest
PGCIL	-	Powergrid Corporation of India Limited
PIU	-	Project Implementation Unit
PRA	-	Participatory Rural Appraisal
PWD	-	Public Works Department
RF	-	Reserved Forest
RFA	-	Recorded Forest Area
RFCTLARRA	-	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
ROW	-	Right of Way
RSET	-	R S Envirolink Technologies Pvt. Ltd.
S/S	-	Substation
SH	-	State Highway
SIA	-	Social Impact Assessment
SMF	-	Social Management Framework
SPCU	-	State Project Coordination Unit
Sq km	-	Square Kilometer
ST	-	Scheduled Tribes
T&D	-	Transmission and Distribution
TL	-	Transmission Line
TPS	-	Thermal Power Station
TRC	-	Terrace Rice Cultivation
USD	-	United States Dollar
VDF	-	Very Dense Forest
VU	-	Vulnerable
WB	-	World Bank
ZSI	-	Zoological Survey of India

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EXECUTIVE SUMMARY

North Eastern Region Power Supply Improvement Project (NERPSIP) is a World Bank funded project aimed at improving the impoverished power transmission and distribution system in the North Eastern states of India with Power Grid Corporation of India Ltd. (POWERGRID), the single transmission utility of the country as the implementing agency (IA). The present Final Environmental Assessment Report (FEAR) is for the transmission and distribution network in Kamrup Metro district of Assam and has been undertaken to verify the actual locational details of the project elements, to report any impacts on the biodiversity and protected area and the project affected people, and to assess the compliance of the Initial Environmental Assessment Report (IEAR) /Environment Management Plan (EMP) prepared and submitted by the IA for the instant project. The elements of the present project include two 132 kV transmission lines of 10.9 km, construction of two new transmission sub-stations, fifteen 33 kV distribution lines of 41.632 km and construction of five new distribution sub-stations. It is pertinent to mention that the transmission and distribution network comprises of underground cables.

Entire project is within the limit of Guwahati Municipal Corporation and almost entire topography of the districts is plain. Hence, transmission and distribution components of the project are also almost in plains.

The final layout of transmission line has been carefully selected from three alternatives. The alignment has successfully avoided all ecological and social sensitive areas such as forest land, protected areas, sacred groves, community conserved areas, important bird areas, wetlands, settlements, common property resources, etc. Out of the two transmission lines, original length of the Kahilipara – GMCH 132 kV line has been increased to 6.4 km from earlier 3.0 km due to the change in the route alignment from partially overhead and partially underground to completely underground. It may also be noted that out of 4.5 km, around 375 m stretch of the Kamakhaya – Paltanbazar 132 kV line is overhead portion on the Nilachal hills, starting from the bottom of the hill and ending at the 132/33 kV Kamakhya GIS substation. This land is under the possession of state govt. The route completely avoids the plantation area and is along the existing PWD road. Hence impact of any magnitude on environment has been nullified. Also, there is no change in the environmental footprints and impacts as envisaged in IEAR. A total of only 2 towers are erected for the proposed overhead portion of the transmission line.

Similarly, the distribution lines too have been aligned mostly along the existing roads and by avoiding forest areas, ecological and social sensitive areas such as protected areas, sacred groves, community conserved areas, important bird areas, wetlands, settlements, common property resources, etc. The original length of the line has been reduced to 41.632 km from earlier 69.834 km due to change in scope, addition of scope, changes in location of substations. Considering that distribution line has minimum environmental footprints and

without any change in land use and other base line data, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated.

Sub-station locations are based on environment and social aspects and technical requirement. Various site-specific parameters that include availability of infrastructure facilities such as access roads, water, distance from railheads, type of land (Government/ revenue/private land); social impacts such as number of families getting affected; CPR including feasibility of acquisition were considered for analysis. The social aspects are provided due weightage after technical requirement in decision making for selection/finalization of land for substation. In the instant case, land for all the proposed substations were either in possession of AEGCL/ APDCL or govt. land has been transferred to AEGCL/ APDCL for better and assured power connectivity.

Prior to identifying the impacts, evaluation and its management, it is important to understand the method of underground cable laying. Trenchless Method with Horizontal Directional Drilling (HDD) will be applied for laying of UG cable in instant project. This method is selected based on the recommendation of PWD and considering the following benefits:

- Very less earth cutting/digging involved.
- Inconvenience to public is very less.
- Obstruction to traffic & road side structures/shops is least.
- Damage to Roads and existing utilities is least.
- Minimum environmental & social impacts

An initial work plan/sequence is prepared for the intended route where U/G cabling is planned. The route is divided preferably in 100 m sections and work plan for each 100 m section is finalized. Since, under the present scope, all the 17 nos. of U/G cabling are to be routed through the major roads of Guwahati area, therefore, work plan for night time with low traffic is envisaged. The plan for the whole route is submitted /intimated to the concerned utilities like PWD, PHE, Traffic, GMC, BSNL & other Telecom Authorities. Joint inspection of route is done with existing utility representatives to ascertain the depth and location of other structures like underground pipes/cables etc. Meanwhile, all the statutory permissions required for UG cabling is obtained prior to execution of work. The work plan intimation is also given to the shop owners, street vendors house owners etc. adjacent to the route along with the duration of work and the probability of temporary inconvenience caused to them.

The sequence of activities involved in underground cable laying along with related safeguard management measures are described below:

i. Excavation of entry (launch) pit and exit (reception) pit. Pit of dimension (2 x 2 x 3) m^3 will be dug along the proposed route at an average distance of 100 meter. It serves as an inspection pit also as existing utilities and their depth can be determined from this. The excavated earth is kept beside the pit maintaining a safe distance and the area is properly barricaded. The pit is backfilled with the same soil after completion of work.

ii. HDD machine placement: Horizontal Deviation Drilling (HDD) Machine is placed near the entry pit with proper barricading.

iii. Drilling/Reaming: Drilling process start with piloting so as to trace the route. Bore holes are made with reamer of different diameter.

iv. HDPE Pipe Jointing: HDPE pipe are joined for 100 mt section by jointing kit and pipe are aligned properly.

v. HDPE Pipe Pulling: The pipes are pulled for 100 m.

vi. Backfilling of Pit and Shifting of Machine: The returning drilling fluids along with the slurry are collected in the entry (launch) pit. This slurry /mud is then disposed of at identified low lying areas with due consent from the owner. After pipes are pulled, pits are backfilled and levelled properly and thereby machine is shifted to a new place.

vii. Construction of Joint Box: Joint Box are placed at the proper jointing pit.

viii. Cable Jointing: Jointing of the cable is done inside the jointing box.

ix. Backfilling and covering of Joint box: After backfilling, Joint Box are covered with slab for safety.

Impacts due to project have been analyzed for all the phases of project i.e. during design, construction and operation. Since, no involuntary acquisition was involved there is no R & R and resettlement issues. Due to electricity supply, land value is expected to increase, therefore, possibility of land value depreciation is not envisaged. Final routes of lines and sites for construction of new sub-stations don't involve any monuments of historical or cultural significance. Sine the project involves underground cables, felling of trees is not involved. Execution of the projects covered in this report has not resulted in any steep rise in traffic volume. The project does not require availing clearances from Department of Telecommunications, and the Ministry of Aviation. However, clearances are being obtained from the Ministry of Railway as transmission and distribution lines are crossing railway tracks at few locations. Further, the present project requires very less vehicular movement and that too restricted to construction period only. Hence, neither any interference with other utility nor steep rise in traffic volume is anticipated/ observed. In sub-stations, all drainage channels along or inside substations are being trained and connected to main or existing drainage to avoid any erosion due to uncontrolled flow of water.

Detailed specification with respect to equipment design and substation drainage and sewage design has been included in tender document to avoid any incidence of land and water contamination. Adequate safety measures are in place to avoid any potential fire/ explosion hazard. All the soil excavated for substations construction are optimally utilized for backfilling and the remaining soil being spread evenly and compacted. Top soil disturbed during the development of sites are used to restore the surface of the platform. Infertile and rocky material are dumped at carefully selected dumping areas and used as fill for substation foundations. Hence, possibility of erosion of exposed area due to construction activity is negligible. To contain the noise level within the permissible limits, measures like providing sound and vibration dampers and rectification of equipment are undertaken. In addition, plantations of sound absorbing species like Casuarinas, Tamarind, and Neem are raised at the

substations that reduce the sound level appreciably. The proposed lines are not passing through any forest area, wildlife area. Since there is no protected area or demarcated/ documented migration path of wildlife like elephant corridor existing near to subproject locations, hence, possibility of any disturbance to wildlife is not imminent. No bird migration/fly path found in project area.

In case of substations, generally the sites are selected in such a manner that the volume of cutting is equal to volume of filling so as to avoid borrowing of the area. Issues relating to operational health and safety has been adequately addressed. Any adverse impact arising during the construction is limited to the boundaries of proposed substation only and neither impacts nearby habitat/property nor health & safety of neighboring community. The labourers are provided with safety gear and provisions for first aid and arrangement for shifting of affected persons to nearby hospitals are also in place. Compensation for injury and death has been ensured through provisions in Safety Plan & Contract condition. Proper sanitation facilities and safe drinking water are being provided in the project locations. The site managers have been advised to ensure that there are no instances of open defecation.

The COVID-19 pandemic outbreak which not only created unprecedented situation all over world but has also impacted every aspects/ activities including project implementation. Since such pandemic was totally unforeseen/ unexpected, impacts associated with such events/situations were not been specifically included in existing EMPs. However, the existing safety plan and other contract conditions particularly related to labours do have provisions to deal with such extraordinary situations.

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mandatory requirements as stipulated in the IEAR. Thus, the adherences to the clauses by the contractors are regularly monitored especially in respect of EMP implementation, OHS compliance. The project has thus far had zero fatality which is indicative of the strict vigil of the IA.

The Capacity building and Institutional Strengthening program of the IA is held intermittently to enhance the skills of the project officials. Further, meetings between IA and AEGCL/APDCL are held on a monthly/ bimonthly basis to assess the work progress and difficulties encountered in respect of land acquisition, RoW and compensation if any.

Public is informed about the project at every stage of execution. Public consultation using different technique like Public Meeting, Small Group Meeting, informal meetings have been carried out during different activities of project cycle. Local people are also getting benefited through project related employment that was being generated. However, following suggestions may be considered to further improve the safeguard measures and also enhance the environmental sustainability of project.

- During the construction phase, the implementing agency needs to ensure strict compliance of the contract provisions/EMP by Contractor especially in respect of workers health and safety.
- Along with labours, supervisors, engineers and Staff of Implementing Agency (IA) should also need to follow the health and safety precautions.

- Need of regular induction and training program for labours and engineers at all sites.
- Training for PMU staff regarding monitoring and implantation of EMP as proposed in IEAR.
- Records of labour registration, health checkup of labours and other working staff need to be maintained at all sites and strictly monitoring to avoid engagement of child labour.
- Training and awareness regarding cleanliness and solid waste disposal to maintain the hygiene in the labour camps and construction sites.
- Demarcation and protection for sites where work has been on hold due to various reasons to avoid accidents and runoff of excavated soil from construction sites
- Project staff of the implementing agency should be well versed with the contents of the IEAR so as to ensure proper compliance by the contractors.
- All the drainage provided in the substation area should be covered to prevent any accidents.

Overall, the planning and layout of the project elements have been undertaken in a judicious manner so as to ensure minimum environmental impact. Also, commissioning of the project will augment the power distribution and availability in the region which will further catalyze economic activity and development of the area/region.

Chapter 1 INTRODUCTION & PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

India's North East Region (NER) stretches across the eastern foothills of the Himalayan mountain range and is comprised of seven states including Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

Recognizing that intrastate Transmission & Distribution (T&D) systems in the NER states have remained very weak and that there is a critical need to improve the performance of these networks, the Central Electricity Authority (CEA) developed a comprehensive scheme for the NER in consultation with Power Grid Corporation of India Limited (PGCIL/ POWERGRID) and the concerned state governments. This scheme is intended to (a) augment the existing T&D infrastructure to improve the reliability of service delivery across all the NER states and (b) build institutional capacity of the power utilities and departments in the NER. This scheme is part of the Government of India's (GoI) wider efforts to develop energy resources in the NER for electricity supply within the region, to strengthen transmission networks, expand and strengthen sub-transmission systems, and extend last mile electricity connectivity to household.

GoI requested for World Bank's (WB) support in implementing a set of priority investments in six NER States In 2016, the WB has approved a loan (IBRD 470 USD Million) to the GoI for **North Eastern Region Power System Improvement Project (NERPSIP)** which aims to create a robust intrastate transmission and distribution network in all the six (6) North Eastern States. The project being funded on 50:50 (WB loan: GoI) basis except the component of capacity building for Rs. 89 crore, which GoI will bear entirely. The scheme is to be taken up under a new Central Sector Plan Scheme of Ministry of Power (MoP).

MoP, GoI has appointed POWERGRID as Implementing Agency (IA) to six North Eastern States for the said project under Tranche-1 in close coordination with the respective State Governments/Utilities. However, the ownership of the assets shall be with the respective State Utilities/State Government which upon progressive commissioning shall be handed over to them for taking care of Operation and Maintenance of assets. POWERGRID is also facilitating in building the institutional capacity of the state departments and utilities to continue managing the rehabilitated networks in an efficient manner. The state wise scope of works proposed under Tranche-1 is given below in **Table 1.1**.

Table 1.1: State Wise Scope of Work Proposed Under Tranche-1

State	Transmission/ Sub-transmission (132 kV & above)			Distribution (33 kV)		
	Line (km)	New S/s (No.)	Total MVA (New & Aug.)	Line (km)	New S/s (No.)	Total MVA (New & Aug.)
Assam	225	11	1668	356	16	240
Manipur	223	2	139	99	13	275
Meghalaya	205	4	940	174	11	150

State	Transmission/ Sub-transmission (132 kV & above)			Distribution (33 kV)		
	Line (km)	New S/s (No.)	Total MVA (New & Aug.)	Line (km)	New S/s (No.)	Total MVA (New & Aug.)
Mizoram	116	3	100	4	1	6
Nagaland	193	5	245	76	10	200
Tripura	236	9	1389	950	34	510
Total	**1198**	**34**	**4481**	**1659**	**85**	**1381**

Source: https://cea.nic.in/wp-content/uploads/transmission/2020/09/mpr_cfs.pdf and updated based upon Monthly Progress Report of Assam PSIP, January 2022

The project has two components namely, Component A: Priority Investments for Strengthening Intrastate Transmission, Sub-transmission, and Distribution Systems, and Component B: Technical Assistance for Capacity Building and Institutional Strengthening (CBIS) of Power Utilities and Departments of Participating States. The total project cost is **Rs. 5111.33 Crore** with financing from both GoI and Bank on 50:50 basis. The Bank is providing financial support to the tune of US$ 470 million (**Rs. 2511.165 Crore**) under the Loan No.-8631-IN which was signed on 28th November, 2016 and became effective from 20th February, 2017. The loan closing date is 31st March, 2023. The remaining financing including capacity building will be met through GoI funding. Details of State wise funding is placed below in **Table 1.2.**

Table 1.2: Details of State Wise Funding

State	World Bank	Government of India		Total (Rs. in Cr.)
	Project Cost (Rs. in Cr.)	Project Cost (Rs. in Cr.)	Capacity Building (Rs. in Cr.)	
Assam	729.485	729.485	14.83	**1473.803**
Manipur	213.690	213.690	14.83	**442.213**
Meghalaya	381.050	381.050	14.83	**776.933**
Mizoram	150.965	150.965	14.83	**316.763**
Nagaland	357.290	357.290	14.83	**729.413**
Tripura	678.685	678.685	14.83	**1372.203**
Total	**2511.165**	**2511.165**	**89.00**	**5111.33**

Source:https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_MoUs/sanctions/NERPSIP%20SANCTION%20ORDER.pdf

1.2 PROJECT JUSTIFICATION

The State of Assam is endowed with rich energy resources but faces significant bottlenecks in electricity access and availability levels. The present per capita energy consumption is of the order of 205 units (kWh) against the regional per capita consumption of about 258 units and national per capita consumption of about 779 units. The State meets its power requirement through about 460 MW of self-generation and about 600MW of power allocation from various central sector generation projects of NHPC and NEEPCO. The present demand (met) is of the order of 1150 MW whereas the un-restricted demand is about 1300 MW. As most of the generation projects in the north eastern region are hydro in nature, the State faces acute shortage of power during low-hydro generation condition.

Presently, the State draws its share of power from central sector generating stations through various intra-state lines connected to the following substations of inter-state transmission system:

- Misa 400/220 kV substation (2x315 MVA)
- Balipara 400/220 kV substation (315 MVA)
- Bongaigaon 400/220 substation (315 MVA)
- Silchar 400/132 substation (2x200 MVA)
- Salakati 220/132 kV substation (2x50 MVA)
- Haflong 132/33 kV substation (2x5 MVA)
- Badarpur Switching Station

Besides this, the State draws power from 220/132 kV Mariani substation of AEGCL, wherein the one circuit of Kathalguri-Misa 400 kV D/C line (operated at 220 kV level) has been looped-in and looped-out and from 132 kV Gohpur substation of AEGCL which is connected to 132 kV Itanagar (Nirjuli) substation of POWERGRID. Another 220 kV substation namely New Mariani has recently been commissioned in the State by POWERGRID. AEGCL is also constructing a 2x315 MVA, 400/220 kV substation at Azara by looping in and looping out Silchar-Bongaigaon 400 kV D/C line (one ckt via Byrnihat). This will further enhance the interconnection of transmission system of Assam with the inter-state transmission network.

As per the 18th Electric Power Survey of CEA, the future demand of the State is expected to grow to about 1817 MW by year 2016-17 and 2534 MW by year 2021-22. This shall be met through various hydro and thermal projects coming up in the north-eastern region in near future, which are as follows:

- Pallatana GBPP : 726 MW
- Bongaigaon TPS : 750 MW
- Kameng HEP : 600 MW
- Lower Subansiri HEP : 2000 MW

The State has a share of about 894 MW from these future generation schemes. With this, the total share of the State from central sector generating stations shall be about 1500 MW.

Besides this, the present Intra-State transmission system of the State is quite old & weak and is unable to cater to the growing power requirements of the State. Although the present transmission and distribution (T&D) system covers many areas of the State, it is inadequate in its reach and due to non-availability of redundant T&D system, outage of any transmission system element results in long term power shortages making the system highly unreliable. Besides, some of the network elements have undergone long term outage due to break-down. Therefore, it has become essential to address the above situation through remedial measures in the T&D system. Accordingly, phase wise strengthening of transmission & sub-transmission system has been proposed.

The transmission schemes proposed under Tranche-1 of Assam State include construction of 224.525 km of 132 kV Transmission Lines (TL) & associated 11 new substations and 355.592 km of 33 kV Distribution Lines (DL) & associated 9 new substations along with augmentation & strengthening of transmission and distribution spread across the State.

The Power Map of Assam indicating the existing and proposed T&D network is placed in **Figure 1.1**. Summary of subprojects to be implemented in the State in Tranche-1 under NERPSIP along with capacity addition and cost is shown in **Table 1.3** below.

Table 1.3: Summary of Subprojects in Tranche- I Under NERPSIP

S. No.	Name of the subproject	Quantity (Nos.)	Capacity Addition (km/MVA)	Estimated Cost (Rs. in Cr.)
1	132 kV Transmission lines	13	224.525 km	1473.803
2	132/33kV substations (New/Augmentation)	20	940 MVA	
3	33 kV Distribution lines	17	174.249 km	
4	33/11kV substations (New/Extension/ Augmentation)	41	150 MVA	

Source: Monthly Progress Report of Assam PSIP, January 2022

1.3 PROJECT BENEFIT

The proposed transmission and distribution schemes will not only improve overall power supply situation but will also improve reliability, quality, security and enhancement of power supply in the North Eastern Region.

1.4 PROJECT SCOPE & PRESENT STUDY

In line with Assam Electricity Grid Corporation Limited's (AEGCL)/ Assam Power Distribution Company Limited's (APDCL), Electricity Department, Government of Assam (GoA), Environment and Social Policy & Procedures Framework (ESPPF), POWERGRID carried out comprehensive environment and social assessment of each subprojects and prepared Initial Environment Assessment Report (IEAR). These reports were subsequently disclosed for public information both on the State Utility, POWERGRID and Bank website after obtaining clearance from The World Bank.

As mandated in the ESPPF, a Final Environment Assessment Report (FEAR) for each subproject need to be prepared with an objective to assess the compliance of mitigation measures identified in IEAR including implementation of EMP provisions by IA/ Contractor. However, as per Project Agreement signed between POWERGRID and Bank such study is required to be undertaken by Independent Agencies as per Term of Reference agreed with Bank. As a part of this development, POWERGRID appointed **R S Envirolink Technologies Pvt. Ltd. (RSET)** as Independent consultant vide Letter of Award (LOA) Ref No.: **NEGW/C&M/2021-22/NERPSIP/900-23/FEAR/LOA-96** dated **11/11/2021** to carry out FEAR study.

The present FEAR is a document developed as a consultancy assignment to validate the work undertaken and to critically examine any deviation, if any with respect to management measures as outlined in the IEAR which is based on AEGCL/APDCL's ESPPF, World Bank's Operational Policies and Bank's Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution.

The scope of the present study includes 132 kV transmission line and associated 132/33 kV substations, 33 kV distribution lines and associated 33/11 kV substations which are being implemented in Kamrup Metro District of Assam. Detail of T&D network are given below and shown in **Figure 1.2** and **Figure 1.3.**

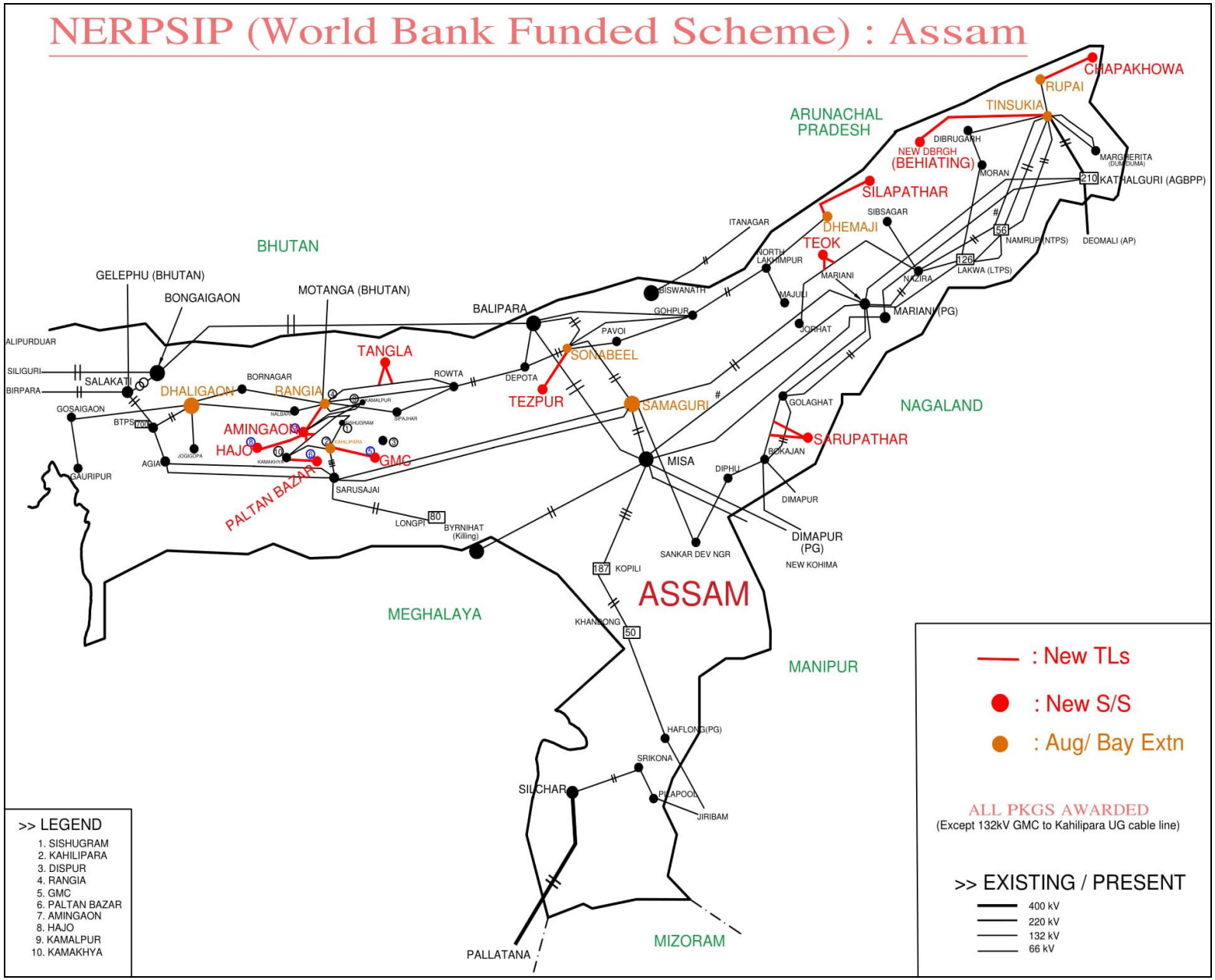


Figure 1.1: Power Map of Assam

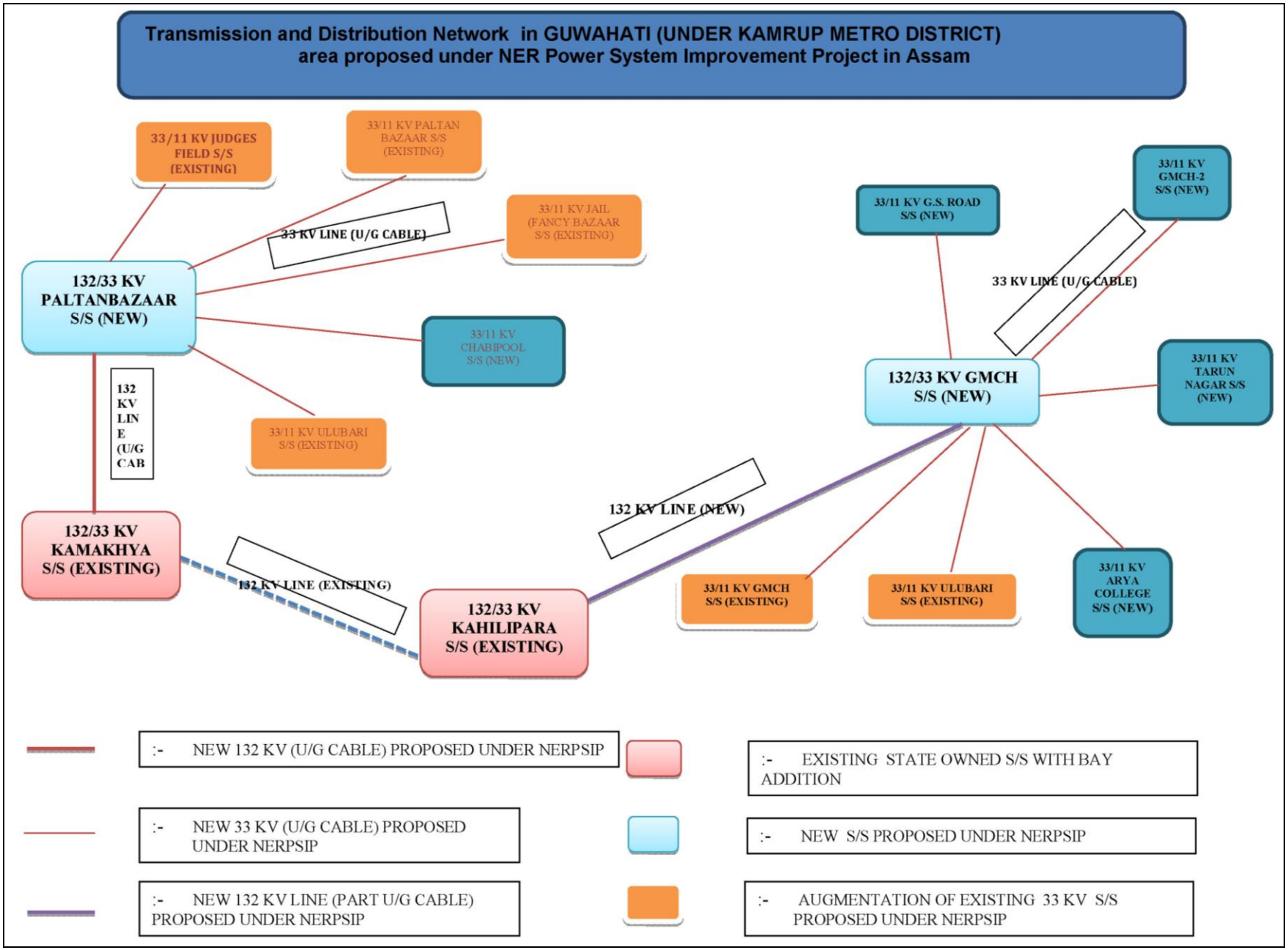


Figure 1.2: Proposed T&D Network in Kamrup Metro Districts under NERPSIP

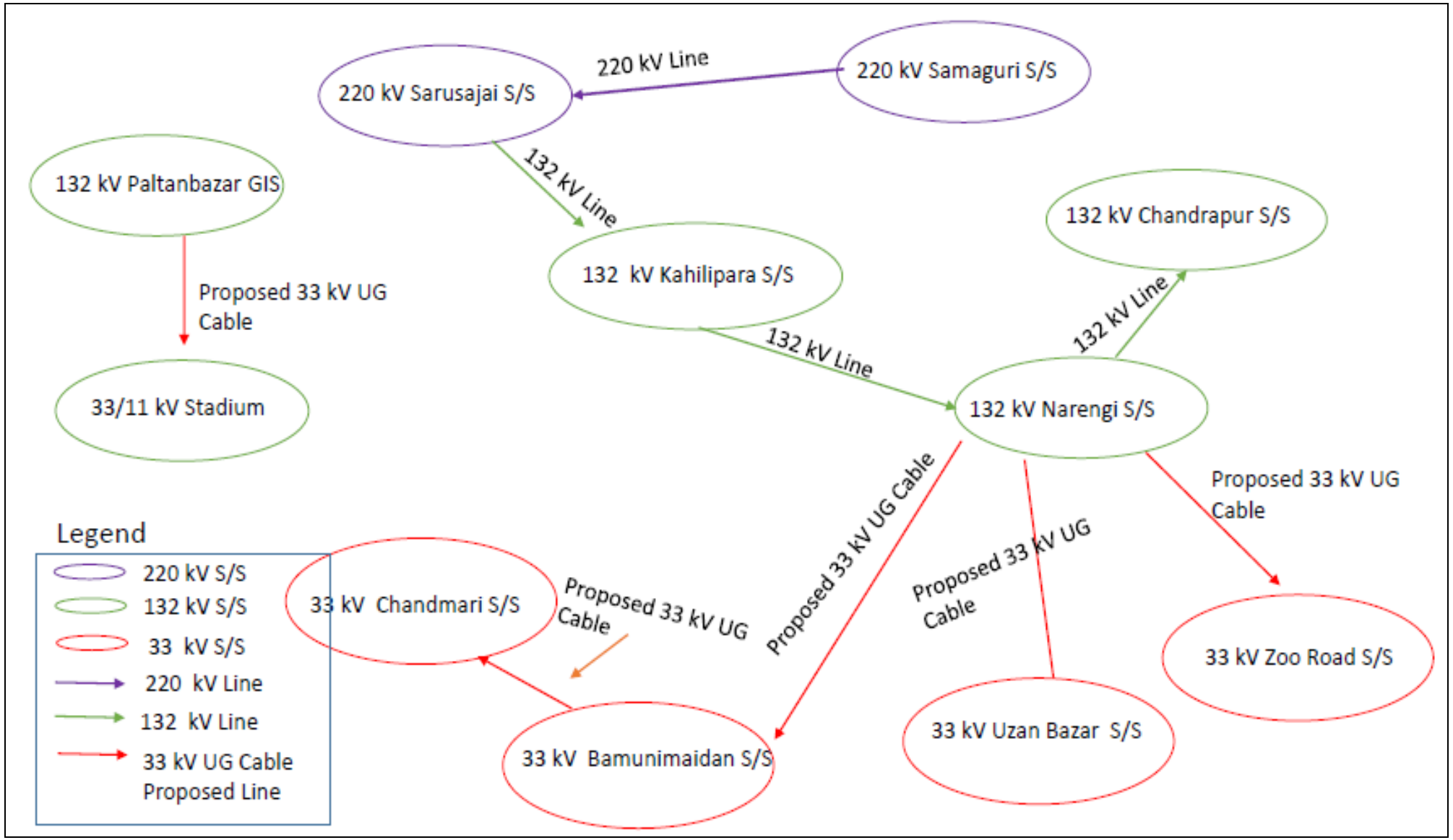


Figure 1.3: Proposed T&D Network in Kamrup Metro Districts under NERPSIP

1.4.1 Transmission Components

The present study includes two 132 kV transmission lines and associated two 132/33 kV substations being implemented in Kamrup Metro District of Assam. Details of Transmission network are given below in **Table 1.4.**

Table 1.4: Details of Transmission Network

S. No.	Name of the Line	Name of New/ Existing Sub-station
1	Kahilipara – Guwahati Medical College Hospital (GMCH) 132 kV Underground (UG) cable – **6.4 km**	Establishment of 2x50 MVA, 132/33 kV new GIS substation at Guwahati Medical College
2	Kamakhya – Paltanbazar 132 kV UG cable – **4.5 km**	Establishment of 2x50 MVA, 132/33 kV new GIS substation at Paltan Bazar

1.4.2 Distribution Components

The present study includes fifteen 33 kV distribution lines and associated ten 33 kV substations being implemented in Kamrup Metro District of Assam. Details of Distribution network are given below in **Table 1.5.**

Table 1.5: Details of Distribution Network

S. No.	Name of the Line	Name of New/ Existing Sub-station
1	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GS Road (new) S/S – **1.1 km**	Establishment of 33/11 kV new GIS substation at GS Road
2	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMCH-2 (new) S/S – **0.250 km**	Establishment of 33/11 kV new GIS substation at GMCH-2
3	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Chabipool (new) S/S – **4.5 km**	Establishment of 33/11 kV new GIS substation at Chabipool
4	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Arya College (new) S/S – **2.229 km**	Establishment of 33/11 kV new GIS substation at Arya College
5	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMC (existing) S/S – **0.585 km**	Strengthening of 33/11 kV substation at GMC
6	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Ulubari (existing) S/S – **1.5 km**	Strengthening of 33/11 kV substation at Ulubari
7	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Judges Field (existing) S/S – **1.692 km**	Strengthening of 33/11 kV substation at Judges Field
8	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Jail (Fancy Bazar) S/S (existing) – **1.192 km**	Strengthening of 33/11 kV substation at Jail (Fancy Bazar)
9	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Bamunimadam S/S (existing) – **4.420 km**	
10	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Paltanbazar (existing) S/S – **0.2 km**	Strengthening of 33/11 kV substation at Paltanbazar
11	33 kV line from 33/11 kV Jalukbari (existing) S/S to 33/11 kV Tarun Nagar (new) S/S – **3.0 km**	Establishment of 33/11 kV new GIS substation at Tarun Nagar (AEC)
12	33 kV line from 33/11 kV Bamunimadam (existing) S/S to 33/11 kV Chandmari (existing) S/S – **1.482 km**	

S. No.	Name of the Line	Name of New/ Existing Sub-station
13	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Zoo Road S/S (existing) – **8.798 km**	
14	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Uzan Bazar S/S (existing) – **9.134 km**	
15	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Stadium S/S (existing) – **1.6 km**	

1.5 OVERALL PROJECT PROGRESS

A brief status on project implementation progress of various transmission & distribution components till January, 2022 is given below in **Table 1.6**.

Table 1.6: Brief Status on Project Implementation Progress

S. No.	Name of the T & D Components	Progress as on November, 2021
A	**Transmission and Distribution Line**	
1	Kahilipara – Guwahati Medical College Hospital (GMCH) 132 kV Underground (UG) cable – **6.4 km**	➢ Route alignment survey completed ➢ 7 nos CSE foundations at 132kV Kahilipara end completed
2	Kamakhya – Paltanbazar 132 kV UG cable – **4.5 km**	➢ Route alignment survey completed ➢ HDPE pipe laid down ➢ Out of 4.5 km, cable laid down in 3.88 km
3	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GS Road (new) S/S – **1.1 km**	➢ Completed on 30/11/2020
4	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMCH-2 (new) S/S – **0.250 km**	➢ Completed on 30/11/2020
5	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Chabipool (new) S/S – **4.5 km**	➢ Route alignment survey completed ➢ Out of 4.5 km, HDPE pipe laid down in 2.3 km
6	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Arya College (new) S/S – **2.229 km**	➢ Completed on 30/11/2020
7	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMC (existing) S/S – **0.585 km**	➢ Completed on 30/12/2020
8	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Ulubari (existing) S/S – **1.5 km**	➢ Completed on 30/11/2020
9	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Judges Field (existing) S/S – **1.692 km**	➢ Completed on 31/03/2021
10	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Jail (Fancy Bazar) S/S (existing) – **1.192 km**	➢ Completed on 28/02/2021
11	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Bamunimadam S/S (existing) – **4.420 km**	➢ Route alignment survey report submitted to PWD for Road reinstatement ➢ Out of 4.42 km, HDPE pipe laid down in 0.5 km
12	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Paltanbazar (existing) S/S – **0.2 km**	➢ Completed on 11/11/2020
13	33 kV line from 33/11 kV Jalukbari (existing) S/S to 33/11 kV Tarun Nagar (new) S/S – **3.0 km**	➢ Route alignment survey completed ➢ HDPE pipe laid down ➢ Cable laid down ➢ 25% of testing completed

S. No.	Name of the T & D Components	Progress as on November, 2021
14	33 kV line from 33/11 kV Bamunimadam (existing) S/S to 33/11 kV Chandmari (existing) S/S – **1.482 km**	➢ Route alignment survey report submitted to PWD for Road reinstatement
15	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Zoo Road S/S (existing) – **8.798 km**	➢ Feasibility report to be submitted by the contractor i.e. M/s NECCON
16	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Uzan Bazar S/S (existing) – **9.134 km**	➢ Feasibility report to be submitted by the contractor i.e. M/s NECCON
17	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Stadium S/S (existing) – **1.6 km**	➢ Completed in October, 2021
B	**Transmission and Distribution Sub-stations**	
1	Establishment of 2x50 MVA, 132/33 kV new GIS substation at Guwahati Medical College	➢ Completed in March, 2021
2	Establishment of 2x50 MVA, 132/33 kV new GIS substation at Paltan Bazar	➢ Completed in September, 2021
3	Establishment of 33/11 kV new GIS substation at GS Road	➢ Completed in March, 2021
4	Establishment of 33/11 kV new GIS substation at GMCH-2	➢ Completed in March, 2021
5	Establishment of 33/11 kV new GIS substation at Chabipool	➢ Charged on 30.09.2020
6	Establishment of 33/11 kV new GIS substation at Arya College	➢ Completed in September, 2021
7	Strengthening of 33/11 kV substation at GMC	➢ Commissioned on 26.04.2019 and handed over to APDCL on 25.02.2021
8	Strengthening of 33/11 kV substation at Ulubari	➢ Commissioned on 06.05.2019 and handed over to APDCL on 25.02.2021
9	Strengthening of 33/11 kV substation at Judges Field	➢ Commissioned on 23.12.2019
10	Strengthening of 33/11 kV substation at Jail (Fancy Bazar)	➢ Commissioned on 30.04.2019
11	Strengthening of 33/11 kV substation at Paltanbazar	➢ Commissioned on 04.03.2019
12	Establishment of 33/11 kV new GIS substation at Tarun Nagar (AEC)	➢ Completed in January, 2022

1.6 OBJECTIVE & METHODOLOGY ADOPTED FOR FEAR STUDY

The main objectives of the FEAR study are to assess the mitigative measures as suggested in IEAR and/or EMP are effectively implemented/ addressed at the ground during pre-construction & construction stages of project cycles. The study also helps in establishing the status of compliance of various mitigation/management measures provided in the IEAR/EMP and suggests gaps or weaknesses, if any.

To achieve this, RSET undertook a comprehensive biophysical, environmental, socioeconomic data gathering exercise along the transmission/ distribution line routes and substations location to assess/verify the actual site-specific measures implemented/ being implemented by IA/ Contractor in respect of measure/ actions listed in IEAR/EMP. The methodologies adopted for instant FEAR are as follows:

Defining Study Area: Environmental impacts of Transmission & Distribution (T&D) projects are not far reaching and are mostly localized to surroundings. However, T & D projects have some effects on natural and socio-culture resources. Study area has been defined as area in immediate vicinity of transmission and distribution lines and substations has been included in the study area.

Review of existing reports: Review of existing reports and data prepared and generated by POWERGRID such as Initial Environment Assessment Report (IEAR), Environment and Social Policy & Procedures Framework (ESPPF), Compensatory Plan for Temporary Damage (CPTD) etc. was undertaken and suitably incorporated in the present report.

Literature review: Review of existing literature was undertaken for collection of secondary baseline data related to physiography, climatic conditions, demography, natural resources including forests/wildlife, protected area and socio-economic features of the study area. Sources and data so collected have been mentioned below:

- 'A Revised Survey of the Forest Types of India' by Champion and Seth (1968) was used for forest type classification of forests in the study area.

- Data collected from published literature of Zoological Survey of India, Forest Survey of India, Botanical Survey of India, Website of Directorate of Environment, Govt. of Assam and other research and government publications for floral and faunal diversity of the study area.

- Conservation status of flora and fauna of the study area as per Indian Wildlife (Protection) Act (1972), threatened status according to IUCN Red List 2020.1, Red Data Book of Indian Plants by Botanical Survey of India, Kolkata.

- Census of India 2011 for demography of the study area.

Collection of primary data and Physical verification of construction elements: To gather primary data/ physical verification, a field visit/ survey of the project area along with IA and Contractor staff was made in December 2021. The data which has been collected from field visit are implementation status of proposed environmental management plan and mitigation measures as suggested in IEAR.

Ground truthing/ physical verification was made with photographic evidence and verification of record maintained by IA and Contracts for various activities for monitoring the compliance of mitigation measures like Health and Safety measures, Solid waste and sanitation, construction of protection wall/ retaining walls, status of labour camps location of proposed substations, and Transmission & Distribution Lines alignments. Findings of field survey were consolidated along with secondary data for interpretation and finding the gaps for immediate necessary action.

Surveys for flora and fauna: The proposed transmission and distribution subprojects are confined in Guwahati city (GMCH area) under Kamrup Metropolitan district of Assam. Also, all the transmission and distribution lines are underground and are passing/ shall pass through the existing PWD road. Hence, involvement of flora along routes of all transmission and

distribution lines under the subject scheme has been completely avoided. Therefore, in absence of any flora and fauna in the study area surveys for flora and fauna were not conducted.

The results of the primary field surveys were supplemented with secondary data to fill the gaps and further with the information generated through PRA.

Consultation: Consultation was carried out with stakeholders like POWERGRID officials, Contractor, migratory labours, local labours, affected people etc. to collect data with respect to compliance of suggested Environmental Management Plan and implementation of mitigation measures.

Development of Maps: Geo-referenced and Google maps with superimposed coordinates of project elements were generated to verify locational details and details of physical features of terrain of the project locations.

Chapter 2 POLICY, LEGAL AND REGULATORY FRAMEWORK

2.1 INTRODUCTION

Power transmission and distribution project activities by their inherent nature and flexibility have negligible impacts on environmental and social attributes. Indian laws relating to environmental and social issues have strengthened in the last decade both due to local needs and international commitments. AEGCL/APDCL, IA and contractors are undertaking its activities within the purview of Indian and State specific laws keeping in mind appropriate international obligations and directives and guidelines with respect to environmental and social considerations of World Bank's Operational Policies.

2.2 CONSTITUTIONAL PROVISIONS

Subsequent to the first United Nations Conference on Human Environment at Stockholm in June, 1972, which emphasized the need to preserve and protect the natural environment, the Constitution of India was amended through the historical 42nd Amendment Act, 1976 by inserting Article 48-A and 51-A (g) for protection and promotion of the environment under the Directive Principles of State Policy and the Fundamental Duties respectively. The amendment, *inter alia* provides:

"The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country". (New Article 48A)

"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures". [New Article 51 A(g)]

Article 21 of the constitution provides, "no person shall be deprived of his life or personal liberty except according to procedure established by law".

Article 21 is the heart of the fundamental rights and has received expanded meaning from time to time after the decision of the Supreme Court in 1978. The Article 21 guarantees fundamental right to life – a life of dignity to be lived in a proper environment, free of danger or disease or infection. Recently, Supreme Court has broadly and liberally interpreted the Article 21, transgressing into the area of protection of environment, and held that the citizen's right to live in an eco-friendly atmosphere is to be interpreted as the basic right guaranteed under Article 21.

Thus, the Indian Constitution now has a two folds provision:

(a) On the one hand, it gives directive to the State for the protection and improvement of environment.

(b) On the other hand, the citizens owe a constitutional duty to protect and improve the natural environment.

2.3 ENVIRONMENTAL PROVISIONS

Environmental issues of T&D projects are manageable given the inherently small 'foot print' of towers and flexibility in siting facilities within a relatively large host area and are mostly localized to surrounding. However, transmission line project may have some adverse effects on natural resources. These impacts can be minimized by careful route selection and siting of substations. The applicable acts, rules, and relevant policies in the context of the project and its status of compliance are presented in **Table 2.1**.

2.4 SOCIAL PROVISIONS

The applicable acts, rules, and relevant policies in the context of the project and its status of compliance are presented in **Table 2.2**.

2.5 WORLD BANK OPERATIONAL POLICY

When World Bank provide governments with financing to invest in projects such as building a road, connecting people to electricity, or treating waste water, World Bank we aim to ensure that the people and the environment are protected from potential adverse impacts. World Bank do this through policies that identify, avoid, and minimize harm to people and the environment. These policies require the borrowing governments to address certain environmental and social risks in order to receive World Bank support for investment projects. The mandatory environment and social requirements with respect to World Bank Operational Policies are presented in **Table 2.3**.

Table 2.1: Environmental Provisions

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	Electricity Act, 2003	To consolidate the laws relating to generation, transmission, distribution, trading and use of electricity. Under the provisions of Section 68(1):- Prior approval of the GoA is a mandatory requirement to undertake any new transmission and distribution project in the State.	Applicable - Transmission line projects are constructed under the ambit of Electricity Act, 2003 following the provisions of Section 68 (1) of act.	Complied with: MoP, GoI approved the NERPSIP comprehensive scheme for six North Eastern States including Assam under vide its Office Memorandum dated 1st December 2014.
2.	Forest (Conservation) Act, 1980	To protect and conserve Forest Areas and Tree Cover. Any transmission/ distribution line traverses forest land, prior clearance is mandatorily required from Ministry of Environment, Forest & Climate Change (MoEF&CC), GoI under the Forest (Conservation) Act, 1980.	Not Applicable - No notified forest area is involved in any of the line routes or substations location.	Not Required
3.	Environment (Protection) Act, 1986	To protect and improve the overall environment. It is umbrella legislation for the protection and improvement of environment.	Applicable – Though some limited compliance measures notified under this EPA, 1986 are to be adhered to relevant rules and regulations under the EPA, 1986 applicable to the operations of AEGCL/APDCL.	Complied with: Though applicable as it is umbrella legislation, however, as such statutory permission/ license is not required.
i)	Ozone Depleting Substances (Regulation and Control) Rules, 2000	Regulate and control manufacturing, import, export and use of Ozone Depleting Substances under Montreal Protocol adopted on 16th September 1987	Applicable - As per the notification, certain control and regulation has been imposed on manufacturing, import, export, and use of these compounds.	Complied with: Only CFC free equipments are being procured/ specified in tender document
ii)	Batteries (Management and Handling) Rules, 2001	Provides certain restriction on disposal of used batteries and its handling and to file half yearly return in prescribed form to the concerned State Pollution Control Board.	Applicable during operation phase only – Used batteries to be disposed to dealers, manufacturer, registered recycler, reconditioners or at the designated collection centers only. A half-yearly return to be filed as per Form-8 to the Assam State Pollution Control Board	Batteries are used during operation phase. Hence, the issue of proper handling and disposal of batteries as per rules not an issue during construction stage.
iii)	Hazardous Wastes (Management,	To ensure that the hazardous wastes are managed in a manner which shall protect the health and the	Applicable – Requires proper handling, storage and disposed only to authorized disposal facility	Generally Used oil is generated after 10-15

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
	Handling and Transboundary Movement) Rules, 2008	environment against the adverse effects that may result from such waste. The used transformer oil has been declared as a hazardous waste vide this notification.	(registered recyclers/ reprocessors). In case it is decided to outsource the process of recycle of used oil to registered recycler as per the provisions of notification then AEGCL/APDCL shall submit the desired return in prescribed form to concerned State Pollution Control Board at the time of disposal of used oil.	years of operation of transformers and hence the issues of handling and disposals of hazardous transformer oil is not an issue at this stage.
iv)	E-waste (Management and Handling) Rules, 2011	To ensure that e-waste is managed in a manner which shall protect health and the environment against the adverse effects that may result from hazardous substance contained in such wastes. It is the responsibility of the bulk consumer to ensure that e-waste generated is channelized to authorized collection centre(s) or registered dismantler(s) or recycler(s) or is returned to the pick-up of take back services provided by the producer.	Applicable – To dispose e-waste generated in environmentally sound manner by channelizing to authorized collection centres/ registered dismantler/ recyclers/ return to producers. AEGCL/APDCL, being a bulk consumer of electrical and electronics equipment's shall maintain record as per Form-2 for scrutiny by State Pollution Control Board.	E-waste disposal is not an issue during construction phase.
4.	The Biological Diversity Act, 2002	To provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith. All restrictions applicable to protected areas like National Park & Sanctuaries are also applicable to these reserves.	Not Applicable - The present project does not involve any biosphere reserves.	Not Required
5.	Ancient Monuments & Archaeological Sites and Remains Act, 1958	To prevent damage to archaeological sites and its maintenance. It also places restriction on activities which can cause harm to the monument /property. The law is however applicable only in monuments identified by the Archaeological Survey of India.	Not Applicable - All such areas have been completely avoided.	Not Required
6.	The Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest	This act recognizes and vests the forest rights and occupation in forest land to forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose	Not Applicable – For linear projects including transmission lines, obtaining NoC from the Gram sabha (Village Council) has been exempted for the requirement of FRA compliance as per	Not Required

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
	Rights) Act, 2006	rights could not be recognized.	MoEF&CC circular dated 5th February 2013 & 15th January 2014.	
7.	Assam control of Tree Felling Rules, 2002	These rules prescribe how tree plantations raised in non recorded forest areas by individuals or institutions are to be governed. They specify which plantations need to be registered, which tree species do not require felling permission, what process is to be followed in order to fell trees outside non recorded forest areas, how is the transit of timber originating from non recorded forest areas regulated and how and why timber can be confiscated to the Government.	Not Applicable – Since all the cable are laid/ being laid underground through felling of trees is not required.	Not Required

Table 2.2: Social Provisions

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	Act ensures appropriate identification of the affected families/ households, fair compensation and rehabilitation of titleholders and non-titleholders. The Act authorizes State Govt. (i.e. GoA) or its authorized Government agency to complete the whole process of acquisition of private land including Social Impact Assessment (SIA), Action Plan for R&R (i.e. Rehabilitation and Resettlement) & its implementation and the AEGCL/APDCL responsibility is limited to identification and selection of suitable land based on technical requirement and ensuring budget allocation.	Not Applicable – Land has been purchased on willing buyer and willing seller basis.	Not Required
2.	Sixth Schedule of the Constitution	The Sixth Schedule provides for administration of tribal areas as autonomous entities. The administration of an autonomous district is vested in a District Council and of an autonomous region, in a Regional Council. These Councils are endowed with legislative, judicial, executive and financial powers.	Not Applicable - Since the project is not implemented in the jurisdiction of Autonomous District, therefore, consent of ADC is not required.	Not Required
3.	Rights of Way (RoW) and Compensation	The Electricity Act, 2003 has a provision for notifying transmission company under section 164 (B) to avail benefits of eminent domain provided under the Indian Telegraph Act, 1885.	Not Applicable – As the project involves underground cable and RoW is not applicable for underground cable.	Not Required
4.	The Right to Information Act, 2005	To provide for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, the constitution of a Central Information Commission and State Information Commissions and for matters connected therewith or incidental thereto.	Applicable - Designated authorities to be in place.	Complied with: Designated authorities are already in place in AEGCL/APDCL.
5.	Indian Treasure Trove Act, 1878 as	To provide for procedures to be followed in case of finding of any treasure, archaeological artifacts etc.	Not Applicable - No such instances reported.	Not Required

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
	amended in 1949	during excavation.		
6.	Workmen's Compensation Act, 1923	This act provides for compensation in case of injury by accidents arising out of and during the course of employment.	Applicable during construction, operation and decommissioning phases – Since labours are engaged during different phases.	Complied with: No such instances of violation of act have been reported.
7.	Minimum Wages Act, 1948	As per this act, the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government.	Applicable during construction, operation and decommissioning phases – Since labours are engaged during different phases.	Complied with: No such instances of violation of act have been reported.
8.	The Child Labour (Prohibition and Regulation) Act, 1986	This Act prohibits employment of children below 14 years of age in Building and Construction Industry covering Railway.	Applicable during construction, operation and decommissioning phases – Since are engaged during different phases.	Complied with: No such instances of violation of act have been reported.
9.	The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013	To provide protection against sexual harassment of women at workplace and for the prevention and redressal of complaints of sexual harassment and for matters connected therewith or incidental thereto.	Applicable during construction, operation and decommissioning phases – Since labours are engaged during different phases.	Complied with: No such instances of violation of act have been reported.

Table 2.3: World Bank Operational Policy

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	OP- 4.01: Environmental Assessment	To ensure the environmental and social and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process.	Applicable - E & S aspects of the project have already been integrated into management procedures based on comprehensive environment assessment undertaken by IA.	Complied with: E & S aspects of the project have already been integrated into management procedures based on comprehensive environment assessment undertaken by IA during 2015.
2.	OP- 4.04: Natural Habitats	To promote and supports natural habitat conservation and improved land use to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, to promote the rehabilitation of degraded natural habitats.	Not Applicable - The present project does not involve any natural habitats such as biodiversity area, protected area, sacred groves etc.	Not Required
3.	OP-4.11: Physical Cultural Resources (PCR)	To preserve PCR and in avoiding their destruction or damage. PCR includes resources of archaeological, paleontological, historical, architectural, and religious (including graveyards and burial sites), aesthetic, or other cultural significance.	Not Applicable - The Present project does not encroach upon any such resources.	Not Required
4.	OP-4.36: Forests	To harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests	Not Applicable – Though all line routes and substation locations successfully avoided encroachment into any Protected and Reserve forests.	Not Required
5.	WB EHS Guidelines for Electric Power Transmission and Distribution	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.	Applicable - EHS guidelines are being followed during project implementation.	Complied with: EHS guidelines are being followed during project implementation.
6.	OP 4.12 – Involuntary	Covers direct economic and social impacts both resulting	Not Applicable - As no involuntary acquisition	Not Required.

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
	Resettlement	from Bank-assisted investment projects and are caused by the involuntary taking of land. To avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	invoked for securing land for proposed substations. However, fresh land required for construction of new substations were secured through direct Purchase on Willing Buyer Willing Seller basis on negotiated rate	
7.	OP 4.10 – Indigenous Peoples	This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. The objective is to design and implement projects in a way that fosters full respect for indigenous peoples so that they receive culturally compatible social and economic benefits, and do not suffer adverse effects during the development process. The project shall ascertain broad community support for the project based on social assessment and free prior and informed consultation with the affected Tribal community, if any.	Not Applicable - Since the project is not implemented in the jurisdiction of Autonomous District, therefore, consent of ADC is not required.	Not Required

2.6 STATUTORY PERMISSION/LICENSES/NOC OBTAINED

The applicability of acts, notifications and policies have already been described in above paragraphs and table. As per the applicability, necessary permission/ licenses/ NOC so far obtained by IA or contractor are:

- Under the provisions of Section 68(1) of Electricity Act, 2003, prior approval GoA is a mandatory requirement to undertake any new transmission project 66kV upward and for distribution project of 33kV system in the State. As a part of permission/ approval, GoI approved the NERPSIP comprehensive scheme for six North Eastern States including Assam under vide its Office Memorandum dated 1st December 2014. In addition, Implementation/ Participation agreement between AEGCL and APDCL and PGCIL has been signed on 29th May, 2015.

- All the contractors are operating with valid labor license as per provision under section – 12(1) of the Contract Labour (Regulation & Abolition) Act, 1970 and also certified under Section- 7(3) of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 from Ministry of Labour & Employment.

- All the contractors have obtained requisite insurance policy as per provisions of Employee Compensation Act, 1923 for its employed workforce.

- Since the underground cable is running along the existing state PWD roads and crossing railway track at multiple locations therefore, Approval/ Permission/ NoC have been obtained from the State PWD Department, Guwahati Traffic Department and Ministry of Railways.

Chapter 3 BASELINE DATA

3.1 INTRODUCTION

This chapter deals with the baseline status of physical, biological, socio-economic environment in the study area as well as district belonging to study area. The baseline data presented in this chapter has been prepared from primary data collected during field studies as well as data/information gathered from available literature and reports published by various institutions and organizations.

3.2 DEFINING STUDY AREA

Environmental impacts of Transmission & Distribution (T&D) projects are not far reaching and are mostly localized to surroundings. However, T & D projects have some effects on natural and socio-culture resources. Study area has been defined as area in immediate vicinity of transmission and distribution lines and substations has been included in the study area.

3.3 DISTRICT BELONGING TO STUDY AREA

The project is an intra-state power sector project located in the State of Assam and study area covers Kamrup Metropolitan (M) district of Assam. The district lies between 90°36'E and 92°12'E Longitudes and 25°43'N and 26°51'N Latitudes the total geographical area of the district is 955 km^2. The district is bounded on the West by the Kamrup district, on the North by the Kamrup and Darrang district and on the East by the Morigaon district. On the South, lies the state of Meghalaya.

3.4 PHYSICAL ENVIRONMENT OF DISTRICT BELONGING TO STUDY AREA

3.4.1 Physiography

As the name itself represents this metropolitan district is mainly an Urban district comprising of Guwahati city as its main component. The rural areas of the district are mainly covered by Chandrapur Revenue Circle and Sonapur Revenue Circle.

The mighty river Brahmaputra forms the Northern boundary of the district with a small part of North Guwahati Revenue Circle forming part of the district situated in the south bank of the Brahmaputra. The river has a lot of influence in the physiography of the district. The entire Guwahati city and Chandrapur stands as immediate neighborhood of the Brahmaputra and are exposed to annual inundation. The Brahmaputra is navigable by river steamers throughout the year. Large number of Government and private steamers especially in the rainy season to connect North Guwahati with Guwahati. At a comparatively short distance from the river banks the groung begins to rise in undulating knolls towards the Khasi Hills in the South. The swampy tracts of land rises up to a height of 3000 feet above mean sea level. All hills are covered with evergreen grass, bamboos and forests. Among them, Sal is the valuable forest product. There are no high mountains in the Kamrup (M) district but small hills can be found almost everywhere, the most beautiful of which is the Kamakhya Hill. The

district is being dissected by many rivers like Digaru, Basistha, Bharalu etc. All the rivers start from Meghalaya and meet with the Brahmaputra.

There are numerous small lakes and marshes in Kamrup (M) district. The lakes or beels are generally sheets of water in the centre of a saucer-like basin. The largest and best known is the Dipoor beel of Guwahati city. These beels are generally natural fisheries which are sold on auction by the local authorities.

3.4.2 Drainage

The Kamrup (M) district is intersected by numerous rivers and streams like Digaru, Basistha, Bharalu etc. All of which come from the hills and mountains and flows into the Brahmaputra which is a gigantic river. The river runs through the Assam Valley and it absorbs waters of all the rivers and streams. In summer, the river looks like the gigantic sea in its wide expanses but in winter the river and its channels zigzag in sandy stretches. In Guwahati, the river is confined between rocks and hills on either side making it comparatively narrow but even here the breadth of the river is over one kilometer. The river spreads itself during the rains and distance from one bank to the other gets expanded. The whole drainage of the district ultimately finds its way to all rivers and tributaries. The rivers and its tributaries are only drains to flush out the water from the district. In rainy season, the rain waters are deposited in all rivers, beels and plain land causing water logging in most parts of the district. Whenever water level recedes in the rivers, the water of plain areas goes out through rivers and its tributaries. Though the Metropolitan city of Guwahati has public drainage system constructed, still lots remains to be done for the city to be free from water logging during the rainy seasons.

The floods which are so frequent in the Brahmaputra cause tremendous changes in the river course and raise the river beds by depositing sediment carried from the upper reaches. This is a common feature of floods in big rivers. The miseries caused by the Brahmaputra and its tributaries are so much so that it needs no description in detail. The villages situated on the river banks gets sub-merged, paddy fields are turned into vast sheets of water, standing crops are destroyed, cattles are swept away and hundreds of cultivators, fishermen and other people living in these areas are rendered homeless. During monsoon, incessant rains throws life out of gear in the district including the Metropolitan city of Guwahati as most part of the city gets water-logged. Overflowing of Bharalu river prompts the administration to take up rescue and relief operations as all important links of communications gets snapped and life hinges on the relief provided by the government and public. After the flood, people generally suffer from epidemics. The untold miseries spread all over the areas.

3.4.3 Meteorology

The climate of Kamrup (M) does not differ from that of the other districts of Assam. Its principal characteristics are a cold and foggy winter, a moderately hot spring and a temperately hot but humid summer. In March and April, the weather begins to grow a little warmer. During the height of the rains, the climate is decidedly oppressive. The air is absolutely saturated with moisture and the damp heat gets very trying. Climatically from February to May, the weather is dry and moisture less and the heat is gentle; from June to October, there is enough rain and moisture and the heat is very unbearable and from

November to January, the climate is cold and foggy. During the later part of December and early part of January, the Brahmaputra fog can be very cold while in March, the wild wind carrying the Brahmaputra sand can be seen everywhere.

From the end of February, the mercury level gradually goes up and in June July and August the temperature reaches the maximum point. During these months, the mean maximum temperature does not generally come down below 31°C and even sometimes it goes to above 40°C. These months are treated as hottest months for the district in each year.

Most of the rainfall in the district occurs during the monsoon, i.e. from June to October each year, while during the other months of the year some rainfall occurs due to the north western winds. The monsoon along humidity makes the climate very oppressive. Although the real temperature may not be so high yet the heat and excessive sweating due to humidity makes it unbearable. As per Statistical Handbook Assam – 2020, the average monthly rainfall was highest in the month of May with 483.6 mm. The lowest rainfall recorded was 0 mm in December.

3.4.4 Soils

The soil of Kamrup (M) district is not much different from those of the other district of Assam. The district is characterized by an abundance of marshes and low lands, the soils of which contain a large percentage of organic matter. In winter the soil becomes excellent for growing crops like pulses and oil seeds. The soils in Kamrup (M) district are generally fertile due to annual deposing of silt. A major portion of total sown area of this district is under agricultural crops and vegetables.

3.4.5 Minerals and Mining

Not all the natural resources are located on or above the earth's surface. Many of the resources are hidden deep below the earth on which human being lives. They are buried deep even under river and sea beds. In the modern industrial era these under-ground resources are of great importance. Much of the industrial growth depends upon these mineral resources. Kamrup (M) district is not rich in minerals deposits or mines. Clay used for the manufacture of bricks are available in Kamrup (M) district especially in Chandrapur where there are many Brick factories and quarries.

3.4.6 Landuse Pattern

Total geographical area of the Kamrup (M) district is 955 sq km. As per the reporting area for landuse (871.50 sq km) considered for the land use pattern classification by the Statistical Handbook Assam - 2020, area of 295.90 sq km falls under forests, area of 238.05 sq km falls under uncultivated land, area of 43.64 sq km falls under other uncultivated land excluding fallow land, area of 11.35 sq km falls under fallow land and the balance 282.56 sq km is net sown area. A brief description about the type and use of land in the district belonging to the study area is given in **Table 3.1**.

Table 3.1: Landuse Pattern of the District Belonging to the Study Area

S. No.	Land Use			Area (ha)
1	Total Geographical Area			95500
2	Reporting Area for Landuse (S. No. 3+6+10+13+14)			87150
3	Classification of Reporting Area	Forests		29590
4		Not Available for Cultivation	Area Under Non-Agricultural Uses	19405
5			Barren and Unculturable Land	4400
6			**Total**	**23805**
7		Other Uncultivated Land Excluding Fallow Land	Permanent Pasture and Other Grazing Land	606
8			Land Under Misc. Tree Crops and Groves not Included in Net Area Sown	3306
9			Culturable Waste Land	452
10			**Total**	**4364**
11		Fallow Land	Fallow Lands Other Than Current Fallows	623
12			Current Fallow	512
13			**Total**	**1135**
14	Net Area Sown			28256
15	Cropped Area			37678
16	Area Sown More Than Once (S. No. 15–14)			9422

Source: Statistical Handbook Assam - 2020

3.5 BIOLOGICAL ENVIRONMENT OF DISTRICT BELONGING TO STUDY AREA

Total forest cover in the district is 460.05 km^2, which is 48.17% of the geographical area of the district. In terms of forest canopy density classes, the district has 225 km^2 under Moderately Dense Forest and 235.05 km^2 under Open Forest. The details of forest cover are given below in **Table 3.2**.

Table 3.2: Forest Cover in District Belonging to Study Area

S. No.	Name of District	Geographical Area (GA) (km^2)	2019 Assessment (Area in km^2)				% of GA	Scrub
			Very Dense Forest	Moderately Dense Forest	Open Forest	Total Area		
1	Kamrup Metropolitan	955	0.00	225.00	235.05	**460.05**	48.17	1.00

Source: India State of Forest Report 2019, Assam

3.6 BIOLOGICAL ENVIRONMENT OF THE STUDY AREA

3.6.1 Floristics Elements

The proposed transmission and distribution subprojects are confined in Guwahati city (GMC area) under Kamrup Metropolitan district of Assam. Also, all the transmission and distribution lines are underground and are passing/ shall pass through the existing PWD road with sufficient width. The only exception is around 375 m of the overhead portion of the Kamakhaya – Paltanbazar 132 kV line which is on the Nilachal hills starting from the bottom of the hill and ending at the 132/33 kV Kamakhya GIS substation. This land is under the possession of state govt.

Vegetation of the area in this stretch of around 375 m is represented by the tree species like *Acacia auriculiformis, Acalypha indica, Areca catechu, Mangifera indica, Lagerostromia speciosa, Abrus precatorius, Bauhinia acuminate (*small tree*), Bombax ceiba, Delonix regia, Erythrina stricts, Sterculia villosa*, etc. Shrubs species consisted of *Ricinus communis, Boehmeria hamiltoniana, Murraya koenigii, Vitex negundo, Chromolaena odorata*, etc.

The herbs were represented by the species like *Acalypha indica, Diplazium esculentum, Achyranthes aspera, Ageratum conyzoides, Mimosa rubicaulis, Musa balbisiana, Alternanthera sessilis, Andrographis paniculata, Xanthium strumarium, Oplismenus compositus*, etc. Bamboo and grasses included the species like *Bambusa bambos, Schizostachyum polymorphus, Axonopus compressus, Saccharum spontaneum, Echinochloa colonum*, etc. The stretch is also represented by few climber species like *Argyreia nervosa, Acacia pennata, Clitoria ternatea, Dioscorea esculenta, Jasmium coarctatum*, etc.

Since all the transmission and distribution lines are underground and are passing/ shall pass through the existing PWD road with sufficient width, involvement of flora along routes of all transmission and distribution lines under the subject scheme has been completely avoided.

3.6.2 Protected Areas

The Protected Area (PA) network in Assam occupies 4069.25 km^2 area, which constitute about 5.19% of the state's geographical area. The Protected Area Network includes 5 National Park (NP) and 20 Wildlife Sanctuaries (WLS). The State has four Tiger Reserves (TR) namely Kaziranga, Manas, Orang and Nameri. Manas TR has also been declared as a Biosphere Reserve (BR), the other BR of the state is Dibru Saikhowa WLS. Kaziranga NP and Manas WLS are also included in the World Heritage sites. Out of these, 2 protected areas i.e. Amchang WLS and Deepor Beel WLS falls in district belonging to study area. However, the proposed transmission and distribution lines do not pass through this protected area. In the instant scheme, all such areas are completely avoided through careful route selection. Details of the protected area is presented below in **Table 3.3**. Map showing location of protected area in the district is given at **Figure 3.1**.

Table 3.3: Protected Area Network in District Belonging to Study Area

S. No.	Protected Areas	Area (km^2)	Year of Notification	ESZ Area (km^2)	Year of ESZ Notification
1	Amchang Wildlife Sanctuary	78.64	2004	109.99	2017
2	Deepar Beel Wildlife Sanctuary	4.14	2009	148.98	2021

Source: https://moef.gov.in/en/rules-and-regulations/esz-notifications-2/

The nearest subproject from Deepar Beel WLS is 33/11 kV line from 33/11 kV Jalukbari S/S (existing) to 33/11 kV Tarun Nagar S/S (new), which is at an aerial distance of approx. 2.3 km (refer to **Figure 3.2**).

The nearest subproject from Amchang WLS is 33/11 kV line from 132/33 kV Narengi S/S (existing) to 33/11 kV Bamunimadam S/S (existing), which is at an aerial distance of approx. 1.9 km (refer to **Figure 3.3**).

3.6.3 Elephant Reserves

The Elephant Reserves (ER) in the state comprises of Chirang-Ripu ER, Sonitpur ER, Dining Patkai ER, Kaziranga-Karbi Anglong ER and Dhansiri-Lungding ER (refer **Figure 3.4**). Total area of these ERs is 10967 sq km. Since none of the Elephant Reserves falls under the Kamrup (M) district, therefore, there will not be any impact of any magnitude on the Elephant Reserves due to the construction of subprojects.

3.6.4 Important Bird & Biodiversity Areas (IBAs)

Bird Life International (www.birdlife.org) has identified 55 Important Bird & Biodiversity Areas (IBAs) in Assam. These IBAs cover 815.92 sq km area, which constitute about 3.6% of the state's geographical area. Out of these 55 IBAs, only 2 IBAs i.e. Amchang Hills and Deepor Beel Bird Sanctuary falls in project district. Details of the IBAs are presented below in **Table 3.4**. Map showing location of IBAs in the district is given at **Figure 3.1**.

Table 3.4: Important Bird & Biodiversity Areas in District Belonging to Study Area

S. No.	IBA Code	IBA Name	Criteria	Important Species	Area (sq km)
1	IN366	Amchang Hills	A1	*Leptoptilos dubius, Leptoptilos javanicus, Pelecanus philippensis, Gyps bengalensis, Gyps tenuirostris*	74
2	IN379	Deepor Beel Bird Sanctuary	A1, A4iii	*Aythya baeri, Leptoptilos dubius, Leptoptilos javanicus, Pelecanus philippensis, Calidris pygmaea, Gyps bengalensis, Gyps tenuirostris, Clanga clanga, Haliaeetus leucoryphus, waterbirds*	4.14

Source: http://www.birdlife.org/datazone/country/india

International Bird Areas are achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The Global criteria are as follows:

A1. Globally threatened species
Criterion: The site is known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern.
A4iii. Congregatory species
Criterion: The site is known or thought to hold, on a regular basis, at least 20,000 waterbirds, or at least 10,000 pairs of seabirds, of one or more species.

The nearest subproject from Deepor Beel Bird Sanctuary IBA is 33/11 kV line from 33/11 kV Jalukbari S/S (existing) to 33/11 kV Tarun Nagar S/S (new), which is at an aerial distance of approx. 2.3 km (refer to **Figure 3.2**). The nearest subproject from Amchang Hills IBA is 33/11 kV line from 132/33 kV Narengi S/S (existing) to 33/11 kV Bamunimadam S/S (existing), which is at an aerial distance of approx. 1.9 km (refer to **Figure 3.3**).

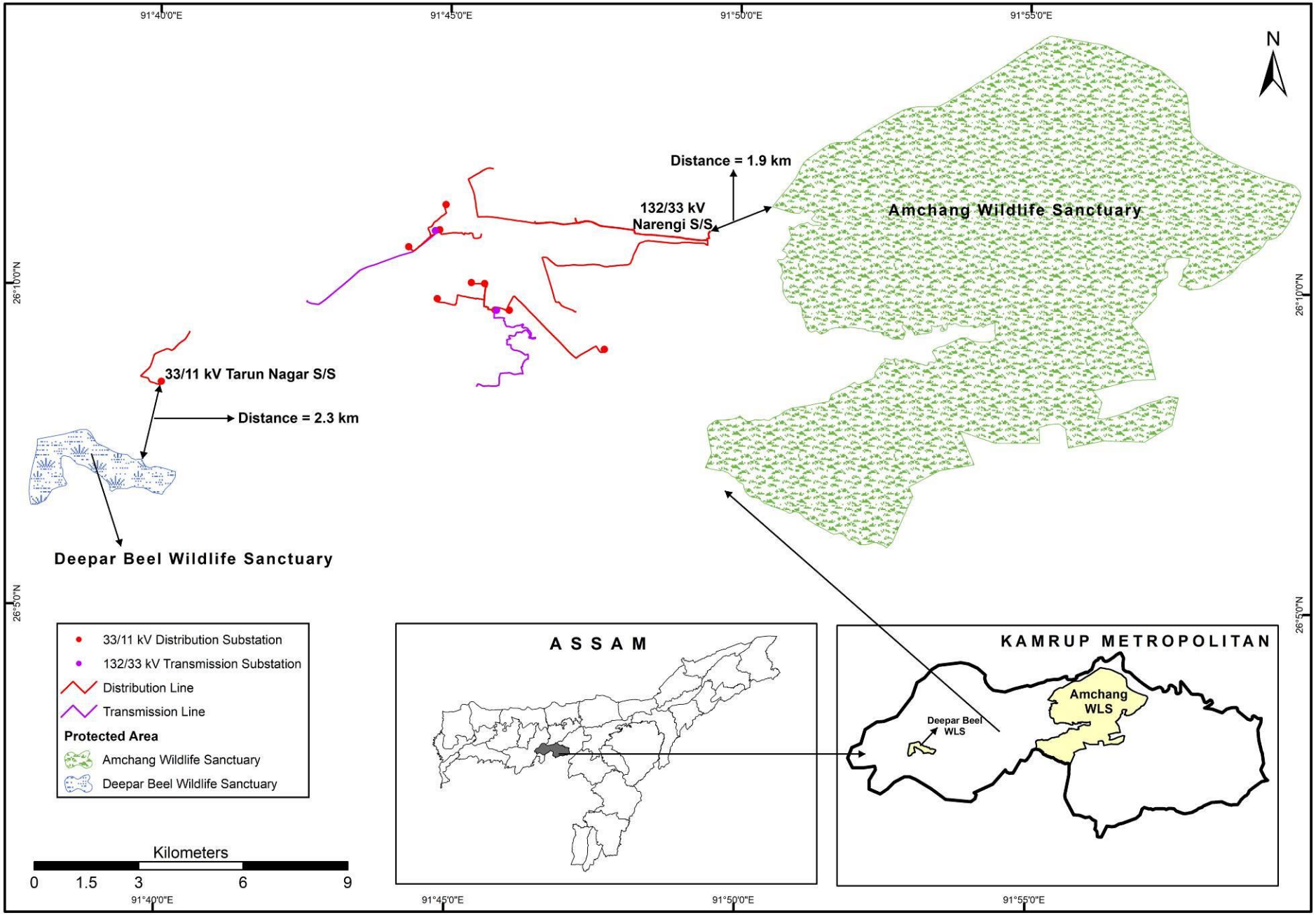


Figure 3.1: Map Showing Protected Area w.r.t. Sub Project Locations

Figure 3.2: Distance of Sub-Projects from Deepar Beel WLS

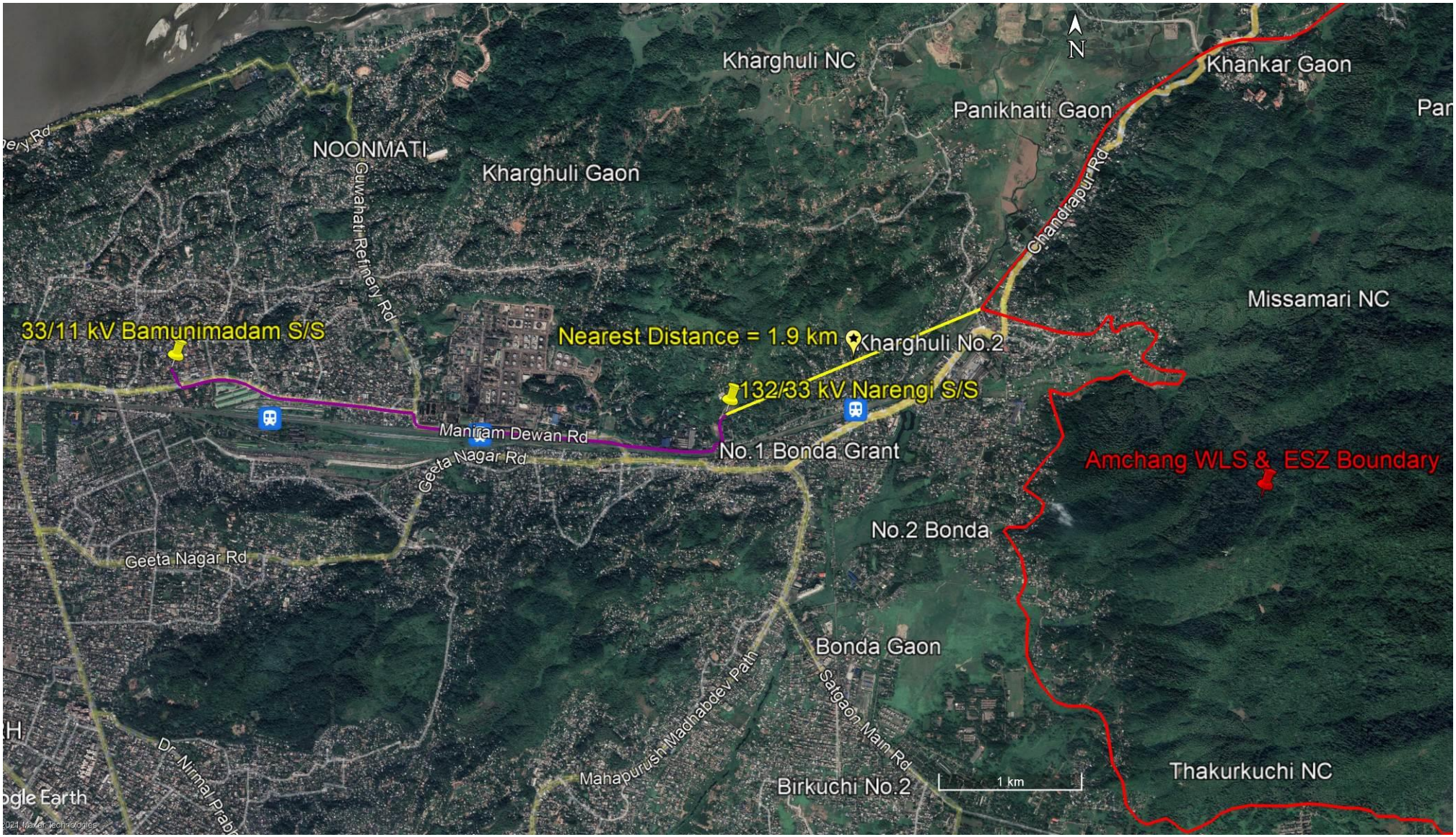


Figure 3.3: Distance of Sub-Projects from Amchang WLS

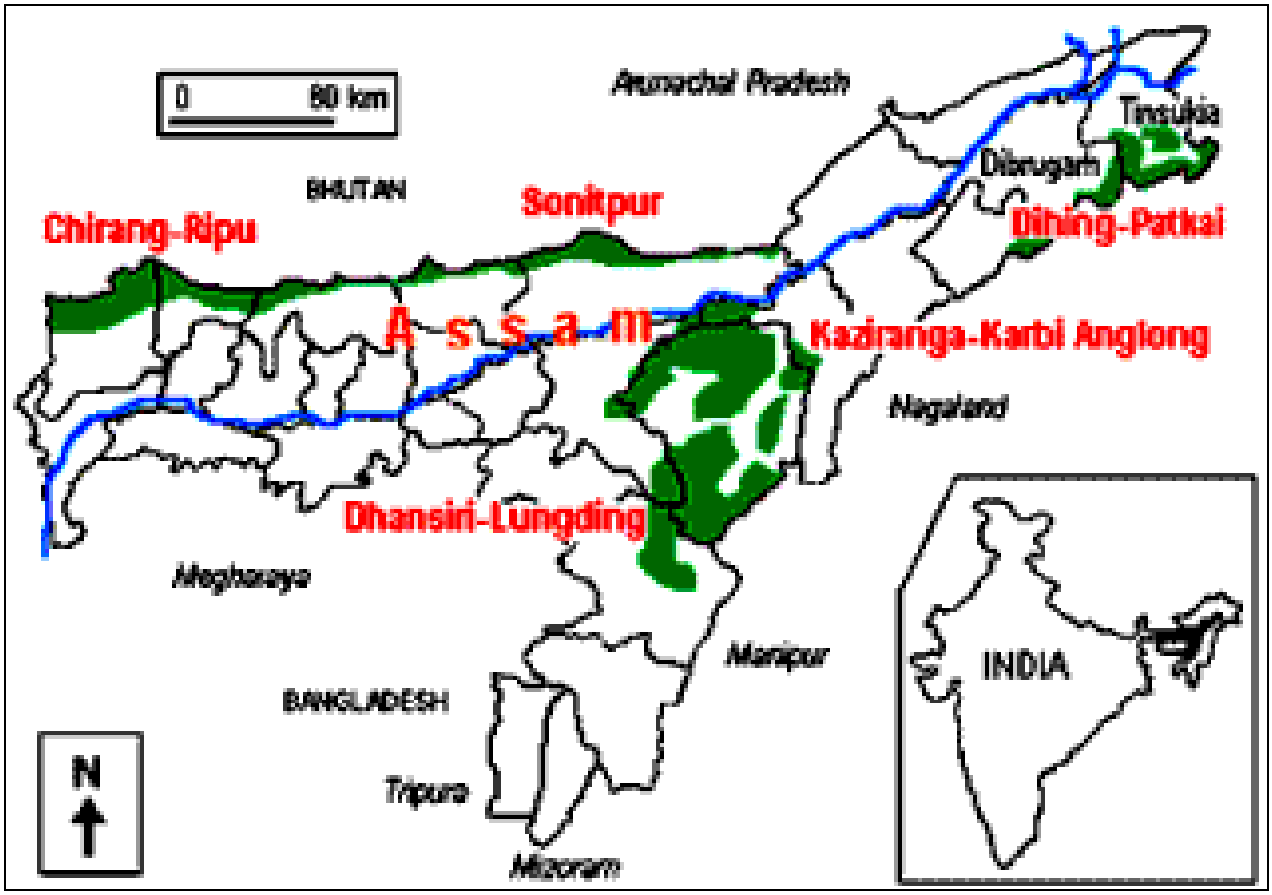


Figure 3.4: Elephant Reserves in Assam

3.6.5 Wetland

As per the National Wetland Atlas of Assam, there are total 5097 wetlands in the state. In addition, 6081 small wetlands (< 2.25 ha) have also been identified. Total wetland area estimated is 764372 ha that is around 9.74 per cent of the geographic area of the state. Natural wetlands dominate the state. The major wetland types are River/Stream accounting for 84% of the wetlands (637164 ha), Lake/Ponds (51257 ha), waterlogged (47141 ha) and Ox-bow lakes (14173 ha). There are two Reservoir/Barrarges mapped with 2833 ha area, which is the major man made wetland type.

Important wetlands of the state include, Deepor beel, Dhir beel, Sareswar beel, Sone beel, Tamaranga beel and Sonai beel. Out of these, only Deepor Beel falls within the study area district. The nearest subproject from Deepr Beel is 33/11 kV line from 33/11 kV Jalukbari S/S (existing) to 33/11 kV Tarun Nagar S/S (new), which is at an aerial distance of approx. 2.3 km (refer to **Figure 3.2**).

3.7 SOCIO-ECONOMIC ENVIRONMENT

For sustainable development, it is important to understand social and economic conditions of the community in the region, impacts of development on the community, measures to mitigate negative impacts and enhance the positive impacts. For new development initiatives, socio economic assessment plays an important role to ensure community participation and their acceptance of the development activity. It also helps in planning the activities for local area development. The population of Assam as per census 2011 was 3,12,05,576 out of which 1,59,39,443 were males and 1,52,66,133 were females. All the subprojects are being

established in the Guwahati and Dispur subdistricts of the Kamrup (M) district. Hence socio environment has been described for both the subdistricts and the district.

Kamrup Metropolitan district has a population of 12,53,938. Out of which 2,16,927 resides in rural area whereas the rest 10,37,011 resides in urban area. The district has a sex ratio of 936 female per 1000 male, the sex ratio in urban area is 933 females per 1000 male while in rural area the sex ratio is 953 females per 1000 male. The population of Schedule Caste and Schedule Tribes in the district constitute 8.1% and 6.0% respectively of the total population. The population of Schedule Caste and Schedule Tribes in urban area constitute of 6.6% and 4.4% respectively. The population of Schedule Caste and Schedule Tribes in rural area constitute of 15.4% and 13.6% respectively. The literacy rate of the district stands at 88.7%. The literacy rate in urban area and rural area stands at 91.2% and 76.4% respectively. For details refer **Table 3.5.**

Guwahati, an urban subdistrict has 1,00,947 households and a population of 4,33,771. The subdistrict has a sex ratio of 933 female per 1000 male. The population of Schedule Caste and Schedule Tribes constitute 7.0% and 3.7% respectively of the total population. The literacy rate of the subdistrict stands at 91.1%. For details refer **Table 3.5.**

Dispur subdistrict has 1,31,101 households and a population of 5,34,872. Out of which 6,309 resides in rural area whereas the rest 5,28,563 resides in urban area. The subdistrict has a sex ratio of 929 female per 1000 male, the sex ratio in urban area is 929 females per 1000 male while in rural area the sex ratio is 949 female per 1000 male. The population of Schedule Caste and Schedule Tribes in the subdistrict constitute 4.8% and 5.3% respectively of the total population. The population of Schedule Caste and Schedule Tribes in urban area constitute of 4.8% and 5.2% respectively. The population of Schedule Caste and Schedule Tribes in rural area constitute of 8.3% and 13.4% respectively. The literacy rate of the subdistrict stands at 91.7%. The literacy rate in urban area and rural area stands at 91.8% and 83% respectively. For details refer **Table 3.5.**

Work participation rate in the district is about 39.2%, out of which 58% are male workers and 19% are female workers. Work participation rate in the rural area of the district is about 40.5%, out of which 56.6% are male workers and 23.5% are female workers. Work participation rate in the urban area of the district is about 38.9%, out of which 58.3% are male workers and 18.1% are female workers. Among the total work force, 84.2% are Main Workers and 15.8% are Marginal Workers. Among the main workers, about 5% workers are cultivators, 2% are agricultural labourers, about 1.9% of work force is engaged as household industrial workers and the rest 91.1% are engaged in other than agricultural activities. For details refer **Table 3.6**.

In the rural areas of the district, among the total work force, 73.3% are Main Workers and 26.7% are Marginal Workers. Among the main workers, about 27.5% workers are cultivators, 9% are agricultural labourers, about 3.3% of work force is engaged as household industrial workers and the rest 60.2% are engaged in other than agricultural activities. In the urban areas of the district, among the total work force, 86.5% are Main Workers and 13.5% are Marginal Workers. Among the main workers, about 0.8% workers are cultivators, 0.7% are

agricultural labourers, about 1.7% of work force is engaged as household industrial workers and the rest 96.8% are engaged in other than agricultural activities. For details refer **Table 3.6.**

Work participation rate in the **Guwahati** subdistrict is about 39%, out of which 77.9% are male workers and 22.1% are female workers. Among the total work force, 86.8% are Main Workers and 13.2% are Marginal Workers. Among the main workers, about 0.5% workers are cultivators, 0.6% are agricultural labourers, about 1.7% of work force is engaged as household industrial workers and the rest 97.2% are engaged in other than agricultural activities. For details refer **Table 3.6**.

Work participation rate in the **Dispur** subdistrict is about 39.1%, out of which 77.1% are male workers and 22.9% are female workers. Work participation rate in the rural area of the subdistrict is about 36.9%, out of which 77.4% are male workers and 22.6% are female workers. Work participation rate in the urban area of the subdistrict is about 39.1%, out of which 77.1% are male workers and 22.9% are female workers. Among the total work force, 87.0% are Main Workers and 13.0% are Marginal Workers. Among the main workers, about 0.6% workers are cultivators, 0.5% are agricultural labourers, about 1.7% of work force is engaged as household industrial workers and the rest 97.2% are engaged in other than agricultural activities. For details refer **Table 3.6**.

In the rural areas of the subdistrict, among the total work force, 75.6% are Main Workers and 24.4% are Marginal Workers. Among the main workers, about 5.7% workers are cultivators, 0.9% are agricultural labourers, about 4.7% of work force is engaged as household industrial workers and the rest 88.6% are engaged in other than agricultural activities. In the urban areas of the subdistrict, among the total work force, 87.1% are Main Workers and 12.9% are Marginal Workers. Among the main workers, about 0.6% workers are cultivators, 0.5% are agricultural labourers, about 1.7% of work force is engaged as household industrial workers and the rest 97.3% are engaged in other than agricultural activities. For details refer **Table 3.6.**

Table 3.5: Demographic & Literacy Profile of the District Belonging to Study Area

District/ Subdistrict		No. of HH	Population			Sex Ratio	Population (above 6 Years)			Schedule Caste				Schedule Tribe				Literate			Literacy Rate		
			Total	Male	Female		Total	Male	Female	Total	Male	Female	%	Total	Male	Female	%	Total	Male	Female	Total	Male	Female
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Kamrup (M) District	Total	293112	1253938	647585	606353	936	1128552	583141	545411	101789	52106	49683	8.1	75121	37902	37219	6.0	1001191	537227	463964	88.7	92.1	85.1
	Rural	45484	216927	111062	105865	953	189594	97256	92338	33499	17181	16318	15.4	29574	14731	14843	13.6	144941	80103	64838	76.4	82.4	70.2
	Urban	247628	1037011	536523	500488	933	938958	485885	453073	68290	34925	33365	6.6	45547	23171	22376	4.4	856250	457124	399126	91.2	94.1	88.1
Guwahati Subdistrict	Total	100947	433771	224424	209347	933	394712	204314	190398	30514	15526	14988	7.0	16065	8232	7833	3.7	359580	192052	167528	91.1	94	88.0
	Rural	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0.0
	Urban	100947	433771	224424	209347	933	394712	204314	190398	30514	15526	14988	7.0	16065	8232	7833	3.7	359580	192052	167528	91.1	94	88.0
Dispur Subdistrict	Total	131101	534872	277263	257609	929	482578	250239	232339	25905	13473	12432	4.8	28169	14292	13877	5.3	442675	236341	206334	91.7	94.4	88.8
	Rural	1279	6309	3237	3072	949	5592	2852	2740	523	274	249	8.3	843	439	404	13.4	4642	2556	2086	83	89.6	76.1
	Urban	129822	528563	274026	254537	929	476986	247387	229599	25382	13199	12183	4.8	27326	13853	13473	5.2	438033	233785	204248	91.8	94.5	89.0

Source: Census of India, 2011

Table 3.6: Occupational Pattern of the District Belonging to Study Area

District/ Subdistrict		Population	Working Population																							
			Total Worker																				Non Worker			
			Main Worker																Marginal Worker							
			Cultivator				Agricultural Labour				Household Industry Labour				Other Worker											
			T	M	F	%	T	M	F	%	T	M	F	%	T	M	F	%	T	M	F	%	T	M	F	%
		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
Kamrup (M) District	Total	1253938	20677	17606	3071	5.0	8259	5843	2416	2.0	7973	5355	2618	1.9	376245	305920	70325	91.1	77778	40889	36889	15.8	763006	271972	491034	60.8
	Rural	216927	17714	15194	2520	27.5	5783	3860	1923	9.0	2106	1205	901	3.3	38715	31382	7333	60.2	23450	11275	12175	26.7	129159	48146	81013	59.5
	Urban	1037011	2963	2412	551	0.8	2476	1983	493	0.7	5867	4150	1717	1.7	337530	274538	62992	96.8	54328	29614	24714	13.5	633847	223826	410021	61.1
Guwahati Subdistrict	Total	433771	736	521	215	0.5	910	714	196	0.6	2457	1713	744	1.7	142841	116842	25999	97.2	22392	12052	10340	13.2	264435	92582	171853	61.0
	Rural	0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
	Urban	433771	736	521	215	0.5	910	714	196	0.6	2457	1713	744	1.7	142841	116842	25999	97.2	22392	12052	10340	13.2	264435	92582	171853	61.0
Dispur Subdistrict	Total	534872	1130	795	335	0.6	862	675	187	0.5	3068	2255	813	1.7	176815	142616	34199	97.2	27159	14844	12315	13.0	325838	116078	209760	60.9
	Rural	6309	101	67	34	5.7	16	7	9	0.9	83	76	7	4.7	1561	1302	259	88.6	567	350	217	24.4	3981	1435	2546	63.1
	Urban	528563	1029	728	301	0.6	846	668	178	0.5	2985	2179	806	1.7	175254	141314	33940	97.3	26592	14494	12098	12.9	321857	114643	207214	60.9

Source: Census of India, 2011

Chapter 4 MAJOR FEATURES OF FINAL ROUTE

4.1 INTRODUCTION

Environmental impact of transmission and distribution (T&D) line projects are not far reaching and are mostly localized to surroundings. However, T&D project has some effects on natural and socio-culture resources. These impacts can be minimized by careful route selection. To minimize these possible impacts, AEGCL/ APDCL & IA at the system planning stage itself try to avoid ecological sensitive areas. Wherever such infringements are substantial, different alternative options are considered to select most viable route alignment. For further optimization of route modern survey techniques/tools like GIS, GPS aerial photography is also applied. Introduction of GIS and GPS in route selection result in access to updated/latest information, through satellite images and further optimization of route having minimal environmental impact. Moreover, availability of various details, constraints like topographical and geotechnical details, forest and environmental details etc. help in planning the effective mitigate measures including engineering variations depending upon the site situation/location. The route/site selection criteria followed is detailed below in the ensuing paragraphs.

4.2 ENVIRONMENTAL CRITERIA FOR ROUTE SELECTION

For selection of optimum route, the following points are taken into consideration:

i. The route of the proposed lines does not involve any human resettlement.
ii. Any monument of cultural or historical importance is not affected by the route of the line.
iii. The proposed route does not create any threat to the survival of any community with special reference to Tribal Community.
iv. The proposed route does not affect any public utility services like water supply, sewer, gas pipelines, playgrounds, schools, other establishments etc.
v. The line route does not pass through any sanctuaries, National Park etc.
vi. The line route does not infringe with area of natural resources.
vii. The line routes will minimize the number of crossings of rivers/railway lines, national and state highways, overhead high voltage power lines, other communication lines

In order to achieve this, AEGCL/ APDCL undertook route selection for individual transmission & distribution lines in close consultation with Urban Local Bodies. Although under National law, AEGCL/ APDCL has the right of eminent domain, yet alternative alignments are considered keeping in mind the above-mentioned factors during site selection, with minor alterations often added to avoid environmentally sensitive areas and settlements at execution stage.

- As a rule, alignments are generally cited away from major towns, whenever possible, to account for future urban expansion. Since the instant project is within the urban area i.e. Guwahati Municipal Corporation therefore in order to abide this rule all the alignments are underground (refer **Figure 4.1 to Figure 4.14** for final route of all T&D network).

- Similarly, forests are avoided to the extent possible, and when it is not possible, a route is selected in consultation with the local Divisional Forest Officer, that causes minimum damage to existing forest resources.
- Alignments are selected to avoid wetlands and unstable areas so as to make the project financial and environmental viable.

In addition, care is also taken to avoid National Parks, Sanctuaries, Eco-sensitive zones, Tiger reserves, Biosphere reserves, Elephant corridors and IBA sites etc. Keeping above in mind the routes of proposed lines under the project have been so aligned that it takes care of above factors. As such, different alternatives for transmission lines were studied with the help of Govt. published data like Forest atlas, Survey of India etc. and Google Maps to arrive at the most optimum route, which can be taken up for detailed survey and assessment of environmental & social impacts for their proper management.

Similarly, the TOR for detailed survey using modern tool like GIS/GPS also contained parameters to avoid/reduce environmental impact while deciding the final route alignment. The major objectives for detailed survey that are part of contract are summarized below:

(i) The alignment of transmission line shall be most economical from the point of view of construction and maintenance.

(ii) Routing of transmission line through protected and reserved forest area should be avoided. In case it is not possible to avoid the forest or areas having large trees completely then keeping in view of the overall economy, the route should be aligned in such a way that cutting of trees is minimum.

(iii) The route should have minimum crossing of major rivers, railway lines, and national/state highways, overhead EHP power lines and communication lines.

(iv) The number of angle point shall be kept to a minimum.

(v) The distance between the terminal points specified shall be kept shortest possible, consistent with the terrain that is encountered.

(vi) Marshy and low line areas, river beds and earth slip zones shall be avoided to minimum risk to the foundations.

(vii) It would be preferable to utilize level ground for the alignment.

(viii) Crossing of power line shall be minimal. Alignment will be kept at a minimum distance of 300 meters from power lines to avoid induction problems on the lower voltage lines.

(ix) Crossings of communication lines shall be minimized and it shall be preferably at right angle, proximity and paralyses with telecom lines shall be eliminated to avoid danger of induction to them.

(x) Area subjected to flooding searches streams shall be avoided.

(xi) Restricted areas such as civil and military airfield shall be avoided. Care shall also be taken to avoid the aircraft landing approaches.

(xii) All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year.

(xiii) Certain areas such as query sites, tea, tobacco and saffron fields and rich plantation, gardens and nurseries that will present the owner problems in of right of way and leave clearance during construction and maintenance should be avoided.

(xiv) Angle point should be selected such that shifting of the point within 100 m radius is possible at the time of construction of the line.

(xv) The area requires special foundations and those prone to flooding should be avoided.

(xvi) For examination of the alternatives and identification of the most appropriate route, besides making use of information/data/details available/extracted through survey of India topographical maps and computer aided processing of NRSA satellite imagery, the contractor shall also carry out reconnaissance/preliminary survey as may be required for the verification and collection of additional information/data/details.

(xvii) The contractor shall submit his preliminary observation and suggestion along with various information/data/details collected and also processed satellite imagery data, topographical map data marked with alternative routes etc. The final evaluation of the alternative routes shall be conducted by the contractor in consultation with owners' representatives and optimal route alignment shall be proposed by the contractor. Digital terrain modeling using contour data from topographical maps as well as processed satellite data shall be done by the contractor for the selected route. A flythrough perspective using suitable software(s) shall be developed or further refinement of the selected route. If required site visit and field verification shall be conducted by the contractor jointly with the owners' representatives for the proposed route alignment.

(xviii) Final digitized route alignment drawing with the latest topographical and other details/features including all river railway lines, canals, roads etc. up to 8 Kms on both side of selected route alignment shall be submitted by the contractors for owner's approval along with report containing other information / details as mentioned above.

The route finalized after detailed survey by contractor follows all the environmental criteria laid down for consideration of route selection. The major features encountered in the finalized route are elaborated in the ensuing paragraphs.

4.2.1 Transmission Line

The transmission line scope includes following subproject:

i. Kahilipara – GMCH 132 kV UG cable – 6.4 km

ii. Kamakhya – Paltanbazar 132 kV UG cable – 4.5 km

In the instant project also, criteria for route selection as mentioned above, has been duly adhered to and the proposed transmission lines have been selected from analysis of three (03) alternatives routes as described in the IEAR. Subsequently, the proposed route was considered for detail survey by Contractor Agency (after awarding of contract).

During detailed survey route alignment of Kahilipara – GMCH 132 kV UG cable was changed from partially overhead and partially underground to completely underground. In case of Kamakhya – Paltanbazar 132 kV UG cable there was no change from the alternative finalized except some negligible alterations as well as geometrical corrections which seems inevitable due to actual ground conditions. The prime objective of changing the route alignment was to completely avoid forest/private plantation areas, Common Property Resource (CPR), and also considering the technical feasibility of the route from operation and maintenance point of view. For changes in scope of work with respect to IEAR scope i.e. changes in the route alignment based upon alternatives studies and detailed survey for transmission line is given is **Table 4.1**.

4.2.2 Distribution Lines

The distribution line scope includes following subprojects:

i. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GS Road (new) S/S – 1.1 km;
ii. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMCH-2 (new) S/S – 0.250 km;
iii. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Chabipool (new) S/S – 4.5 km;
iv. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Arya College (new) S/S – 2.229 km;
v. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMC (existing) S/S – 0.585 km;
vi. 33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Ulubari (existing) S/S – 1.5 km;
vii. 33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Judges Field (existing) S/S – 1.692 km;
viii. 33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Jail (Fancy Bazar) S/S (existing) – 1.192 km;
ix. 33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Bamunimadam S/S (existing) – 4.420 km;
x. 33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Paltanbazar (existing) S/S – 0.2 km;
xi. 33 kV line from 33/11 kV Jalukbari (existing) S/S to 33/11 kV Tarun Nagar (new) S/S – 3.0 km;
xii. 33 kV line from 33/11 kV Bamunimadam (existing) S/S to 33/11 kV Chandmari (existing) S/S – 1.482 km;
xiii. 33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Zoo Road S/S (existing) – 8.798 km;
xiv. 33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Uzan Bazar S/S (existing) – 9.134 km;
xv. 33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Stadium S/S (existing) – 1.6 km.

Distribution lines not exceeding 10 kms and intending for providing power supply to the predestined areas have negligible environmental and social impacts. Hence alternative analysis study is not required for these lines. However, for distribution lines having line length of more than 10 kms, details of alternative route alignment study are carried out. In the instant project length of all the distribution line ranges from 0.25 km to around 9 km and lines are laid/ being laid underground connecting two respective substations in the city, by the sides of existing main and approach roads areas. Hence, alternative analysis studies for these lines were not required/conducted. However, detailed survey for all the lines was carried out by Contractor Agency (after awarding of contract) and criteria for route selection as mentioned above, has been duly adhered to.

Due to the geotechnical studies carried out during detailed survey and other administrative issues four substations were shifted to entirely new locations. This change in location resulted in complete change in the route of distribution lines mentioned at S. No. i, iii and xi. However, here also routes were finalized with prime objective of avoiding forest/private plantation areas, Common Property Resource (CPR), and also considering the technical feasibility of the route from operation and maintenance point of view. The change in the route length of other lines is due to further optimization of route during ground truthing/ detailed survey.

For changes in scope of work with respect to IEAR scope i.e. changes in the route alignment based upon alternatives studies and detailed survey for distribution line is given is **Table 4.1**.

Table 4.1: Change in Scope of Work w.r.t. IEAR

S. No.	Scope as per IEAR	Current Status	Justification/ Remarks
Transmission Component			
1	Kahilipara – GMCH 132 kV TL – **3 km (UG – 2 km, OH – 1 km)**	Kahilipara – GMCH 132 kV UG cable – **6.4 km**	Change in current status is due to the change in the route alignment from partially overhead and partially underground to completely underground. The route completely avoids the plantation area and is along the existing PWD road. Hence impact of any magnitude on environment has been nullified.
2	Kamakhya – Paltanbazar 132 kV UG cable – **4.5 km**	Kamakhya – Paltanbazar 132 kV UG cable – **4.5 km**	Remain unchanged
Distribution Component			
1	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GS Road (new) S/S – **3.6 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GS Road (new) S/S – **1.1 km**	Change in current status is due to the change in route as location of 33/11 kV GS Road substation has been changed. With the change in substation location length of line was decreased by 2.5 km. All the criteria for route selection as mentioned above, has been duly adhered to during finalization of this new route.
2	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMCH-2 (new) S/S – **3.3 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMCH-2 (new) S/S – **0.250 km**	Change in current status is due to the change in route as location of 132/33 kV GMCH and 33/11 kV GMCH-2 substations has been slightly changed. Moreover, both the substations are now in same campus.
3	33 kV line from Paltanbazar (existing) S/S to 33/11 kV Chabipool (new) S/S – **4 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Chabipool (new) S/S – **4.5 km**	Change in current status is due to the change in route as location of 33/11 kV Chabipool substation has been changed. With the change in substation location length of line was increased by 0.5 km. All the criteria for route selection as mentioned above, has been duly adhered to during finalization of this new route.
4	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Arya College (new) S/S – **2.229 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Arya College (new) S/S – **2.229 km**	Remain unchanged
5	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMC (existing) S/S – **6.4 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV GMC (existing) S/S – **0.585 km**	Change in current status is due to the change in route as location of 132/33 kV GMCH substation has been slightly changed. Also, the route was further optimized during ground truthing survey.
6	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Ulubari (existing) S/S – **6 km**	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Ulubari (existing) S/S – **1.5 km**	Change in current status is due to the change in route as location of 132/33 kV GMCH substation has been slightly changed. Also, the route was further optimized during ground truthing survey.
7	33 kV line from	33 kV line from 132/33	No change in the route, however, length has

S. No.	Scope as per IEAR	Current Status	Justification/ Remarks
	132/33 kV Paltanbazar (existing) S/S to 33/11 kV Judges Field (existing) S/S – **5 km**	kV Paltanbazar (existing) S/S to 33/11 kV Judges Field (existing) S/S – **1.692 km**	decreased when optimized during ground truthing survey.
8	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Jail (Fancy Bazar) S/S (existing) – **4 km**	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Jail (Fancy Bazar) S/S (existing) – **1.192 km**	No change in the route, however, length has decreased when optimized during ground truthing survey.
9	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Bamunimadam S/S (existing) – **4.420 km**	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Bamunimadam S/S (existing) – **4.420 km**	Remain unchanged
10	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Paltanbazar (existing) S/S – **2 km**	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Paltanbazar (existing) S/S – **0.2 km**	No change in the route, however, length has decreased when optimized during ground truthing survey.
11	33 kV line from 132/33 kV GMCH (new) S/S to 33/11 kV Tarun Nagar (new) S/S – **5.3 km**	33 kV line from 33/11 kV Jalukbari (existing) S/S to 33/11 kV Tarun Nagar (new) S/S – **3.0 km**	Change in current status is due to the change in route from "132/33 kV GMCH (new) S/S to 33/11 kV Tarun Nagar (new)" to "33/11 kV Jalukbari (existing) S/S to 33/11 kV Tarun Nagar (new) S/S". Also, location of 33/11 kV Tarun Nagar substation has been changed. With the change in substation location length of line was decreased by 2.3 km. All the criteria for route selection as mentioned above, has been duly adhered to during finalization of this new route.
12	33 kV line from 33/11 kV Bamunimadam (existing) S/S to 33/11 kV Chandmari (existing) S/S – **1.482 km**	33 kV line from 33/11 kV Bamunimadam (existing) S/S to 33/11 kV Chandmari (existing) S/S – **1.482 km**	Remain unchanged
13	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Zoo Road S/S (existing) – **8.798 km**	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Zoo Road S/S (existing) – **8.798 km**	Remain unchanged
14	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Uzan Bazar S/S (existing) – **9.134 km**	33 kV line from 132/33 kV Narengi (existing) S/S to 33/11 kV Uzan Bazar S/S (existing) – **9.134 km**	Remain unchanged
15	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Stadium S/S (existing) – **1.6 km**	33 kV line from 132/33 kV Paltanbazar (existing) S/S to 33/11 kV Stadium S/S (existing) – **1.6 km**	Remain unchanged

Figure 4.1: Satellite Imagery Showing Route of Kamakhya – Paltanbazar 132 kV UG Cable

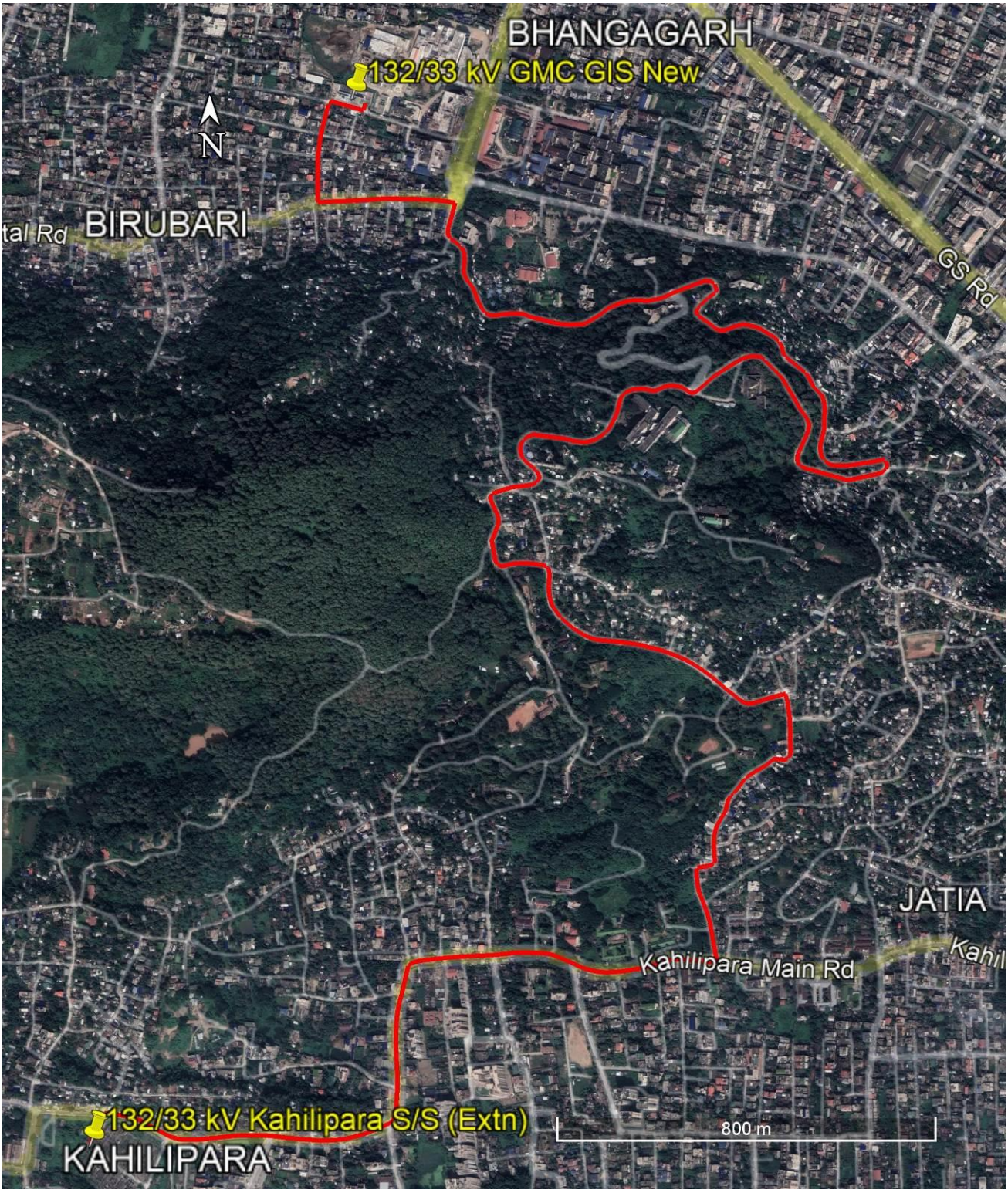


Figure 4.2: Satellite Imagery Showing Route of Kahilipara – GMCH 132 kV UG Cable

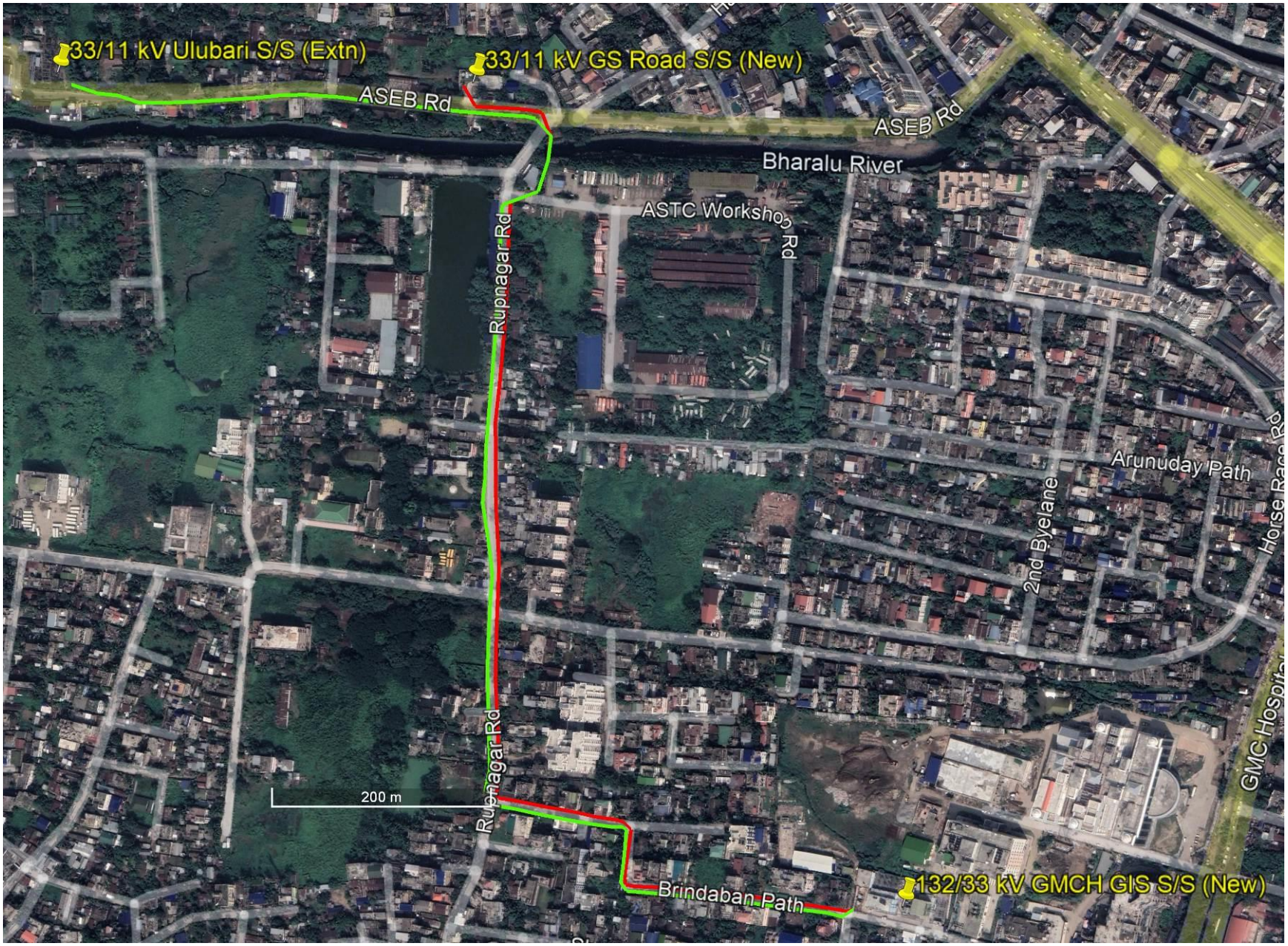


Figure 4.3: Satellite Imagery Showing Route of 33 kV line from 132/33 kV GMCH S/S (New) S/S to 33/11 kV GS Road S/S (New) and 33/11 kV Ulubari S/S (Extn)

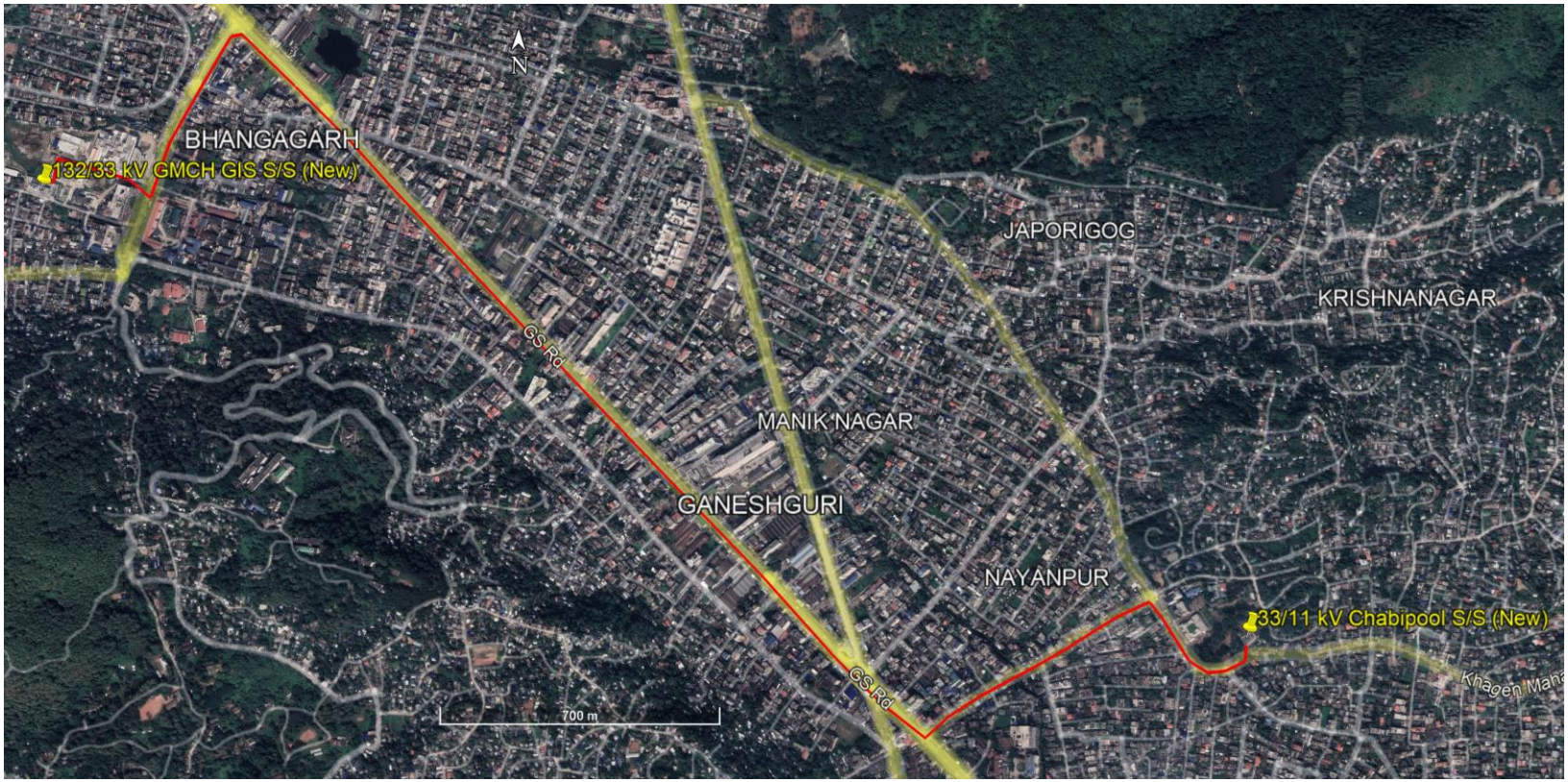


Figure 4.4: Satellite Imagery Showing Route of 33 kV line from 132/33 kV GMCH S/S (New) to 33/11 kV Chabipool S/S (New)

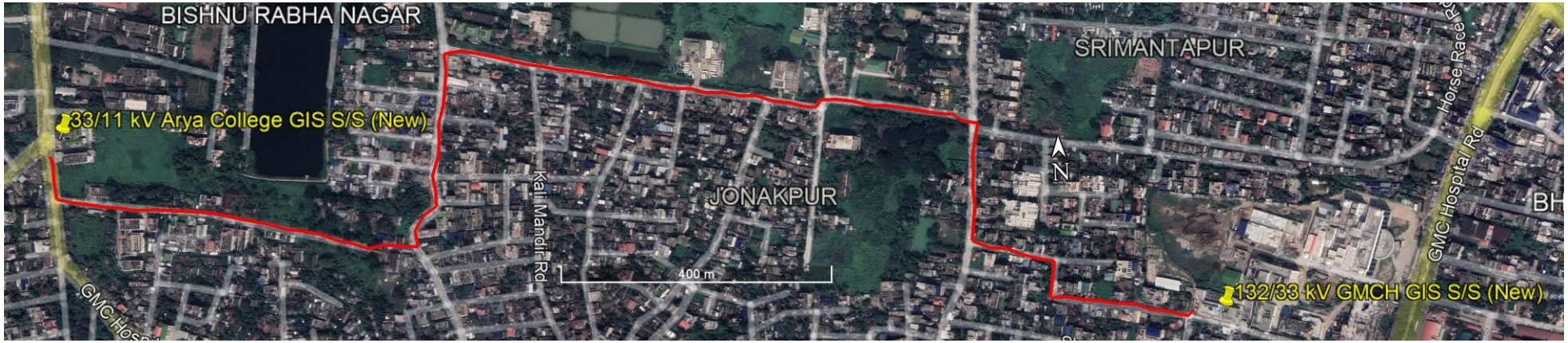


Figure 4.5: Satellite Imagery Showing Route of 33 kV line from 132/33 kV GMCH S/S (New) to 33/11 kV Arya College S/S (New)

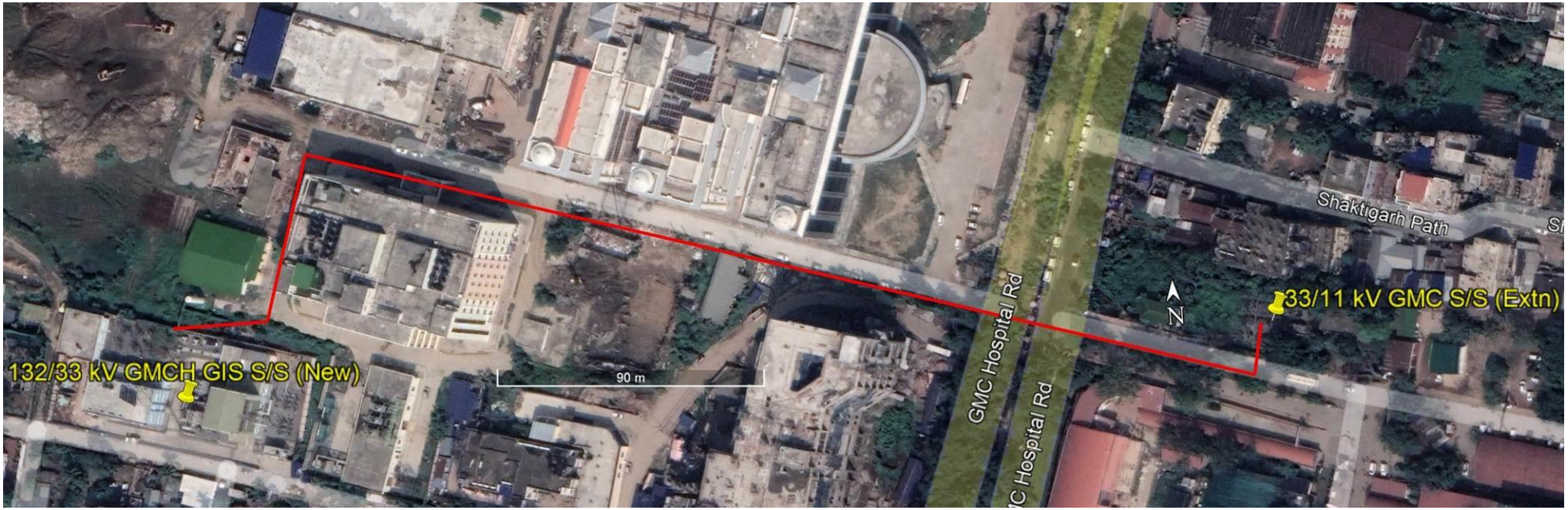


Figure 4.6: Satellite Imagery Showing Route of 33 kV line from 132/33 kV GMCH S/S (New) to 33/11 kV GMC S/S (Extn)

Figure 4.7: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Narengi S/S (Extn) to 33/11 kV Bamunimadam S/S (Extn)

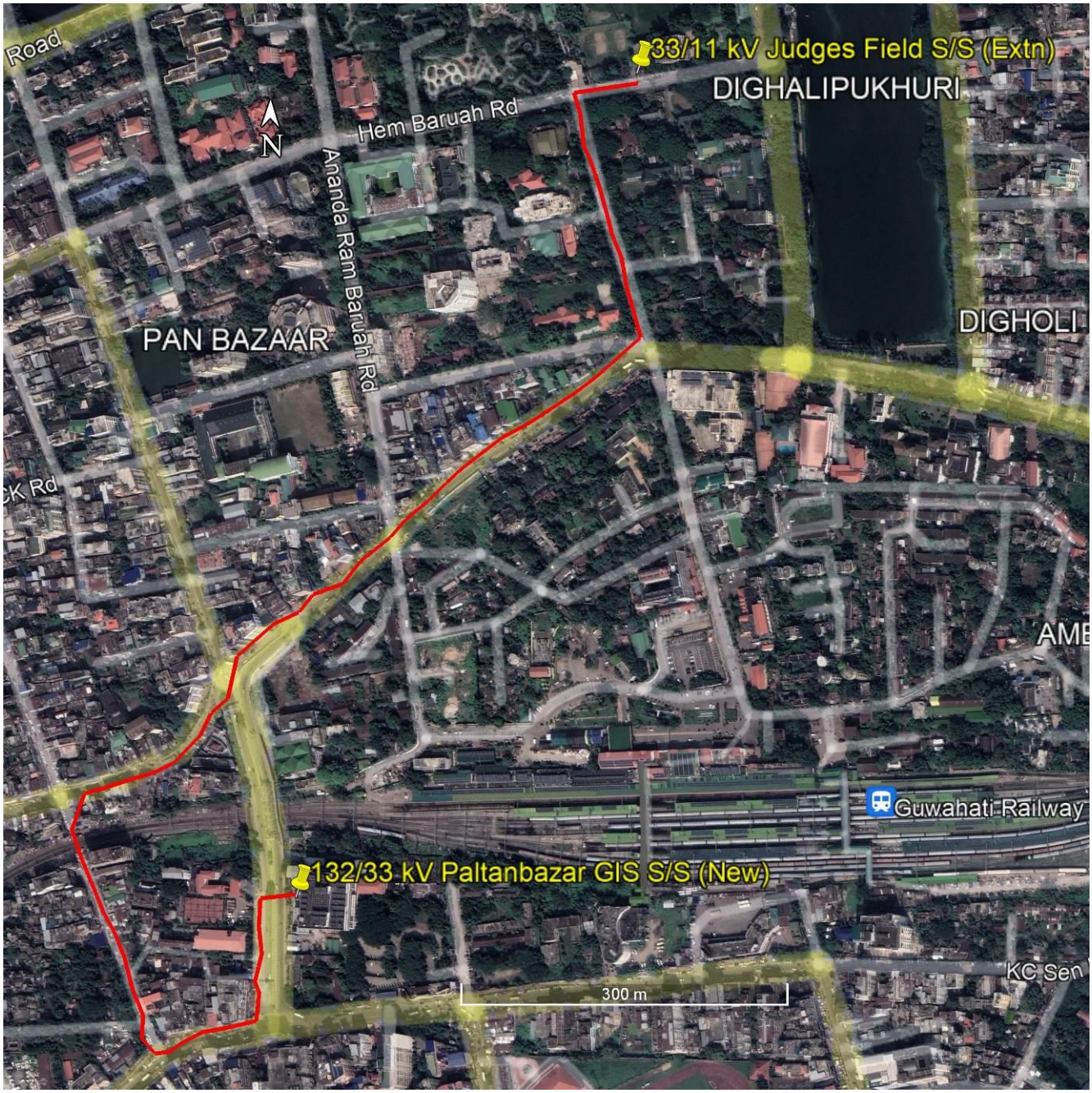


Figure 4.8: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Paltan Bazar S/S (New) to 33/11 kV Judges Field S/S (Extn)

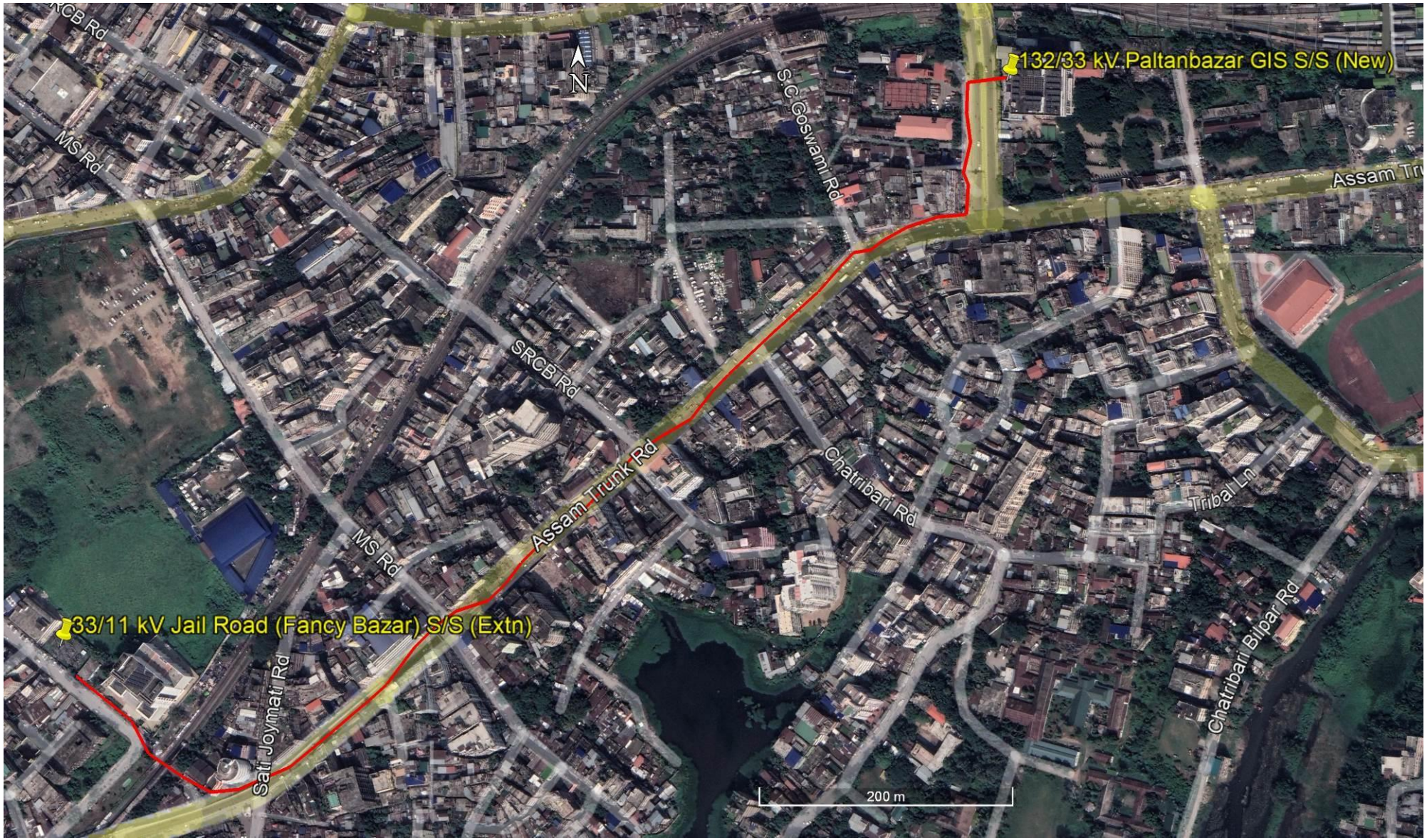


Figure 4.9: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Paltan Bazar S/S (New) to 33/11 kV Jail Road (Fancy Bazar) S/S (Extn)

Figure 4.10: Satellite Imagery Showing Route of 33 kV line from 33/11 kV Jalukbari S/S (Extn) to 33/11 kV Tarun Nagar (AEC) S/S (New)

Figure 4.11: Satellite Imagery Showing Route of 33 kV line from 33/11 kV Bamunimadam S/S (Extn) to 33/11 kV Chandmari S/S (Extn)

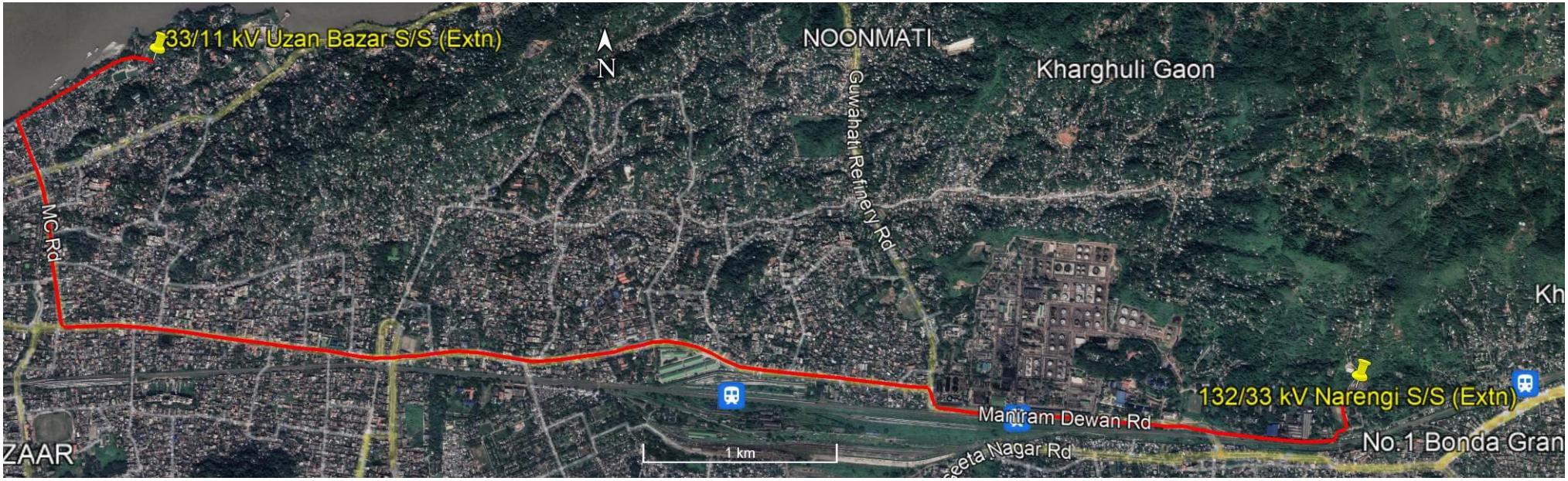


Figure 4.12: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Narengi S/S (Extn) to 33/11 kV Uzan Bazar S/S (Extn)

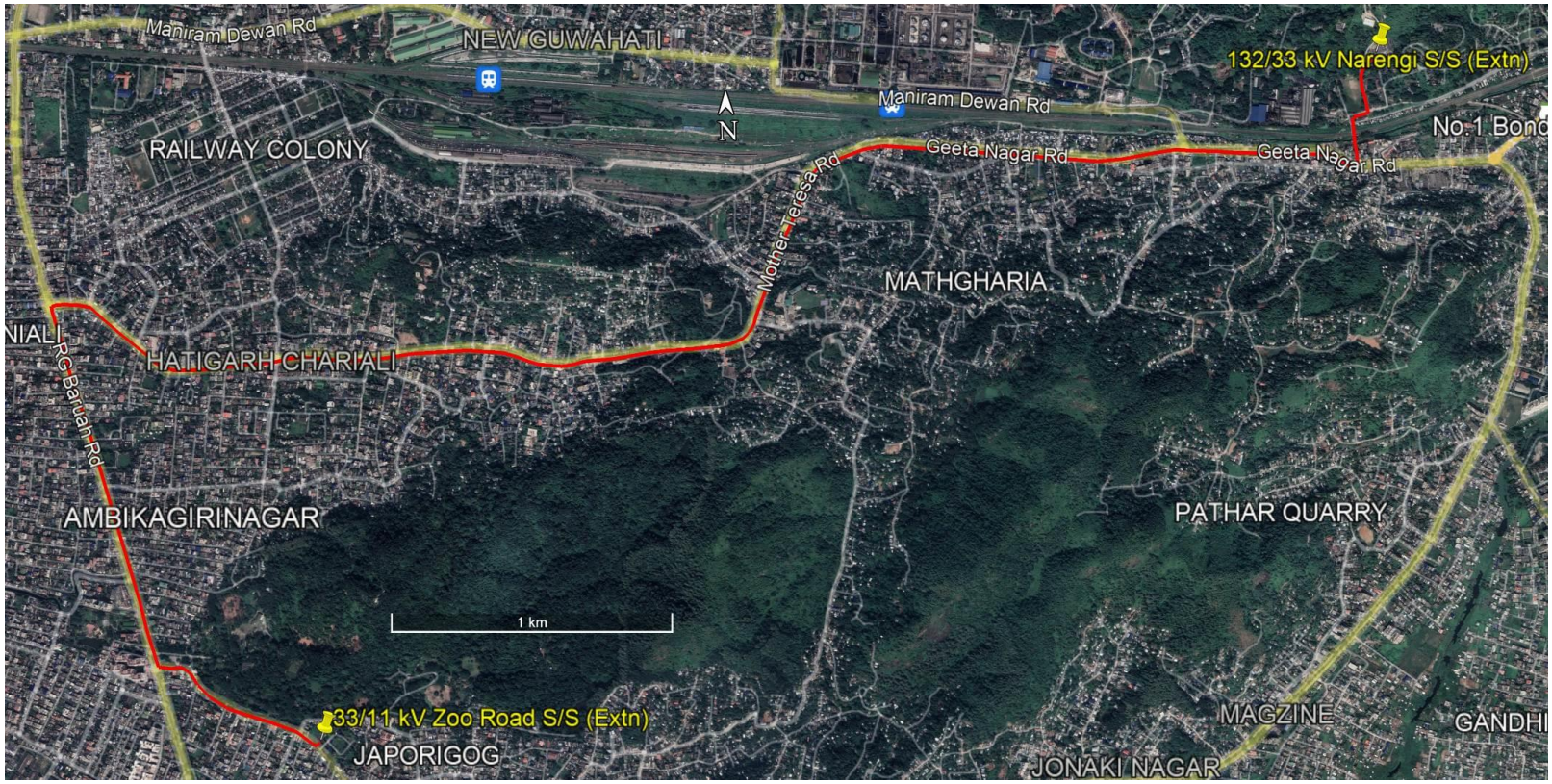


Figure 4.13: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Narengi S/S (Extn) to 33/11 kV Zoo Road S/S (Extn)

Figure 4.14: Satellite Imagery Showing Route of 33 kV line from 132/33 kV Paltanbazar S/S (New) to 33/11 kV Stadium S/S (Extn)

4.2.3 Sub-stations

For sub-station, site selection analysis of 2-3 alternatives sites is usually carried out based on environment and social aspects and technical requirement. Such analysis considers various site-specific parameters that include availability of infrastructure facilities such as access roads, water, distance from railheads, type of land (Government/ revenue/private land); social impacts such as number of families getting affected; CPR including feasibility of acquisition. The finalization of substation land is done based on above analysis and site visit/verification. The social aspects are provided due weightage after technical requirement in decision making for selection/finalization of land for substation.

In the instant case, land for all the proposed substations were either in possession of AEGCL/ APDCL or govt. land has been transferred to AEGCL/ APDCL for better and assured power connectivity. The land parcels were acquired as per above mentioned analysis and site visit/ verification. Also, as per the provisions of ESPPF, all land transferred were reviewed/ approved by a broad-based committee comprising representatives of different sections including those from the IA and Govt. of Assam. The finalized location of transmission and distribution substations is given below in **Table 4.2**.

Table 4.2: Finalized Location of Transmission & Distribution Substation

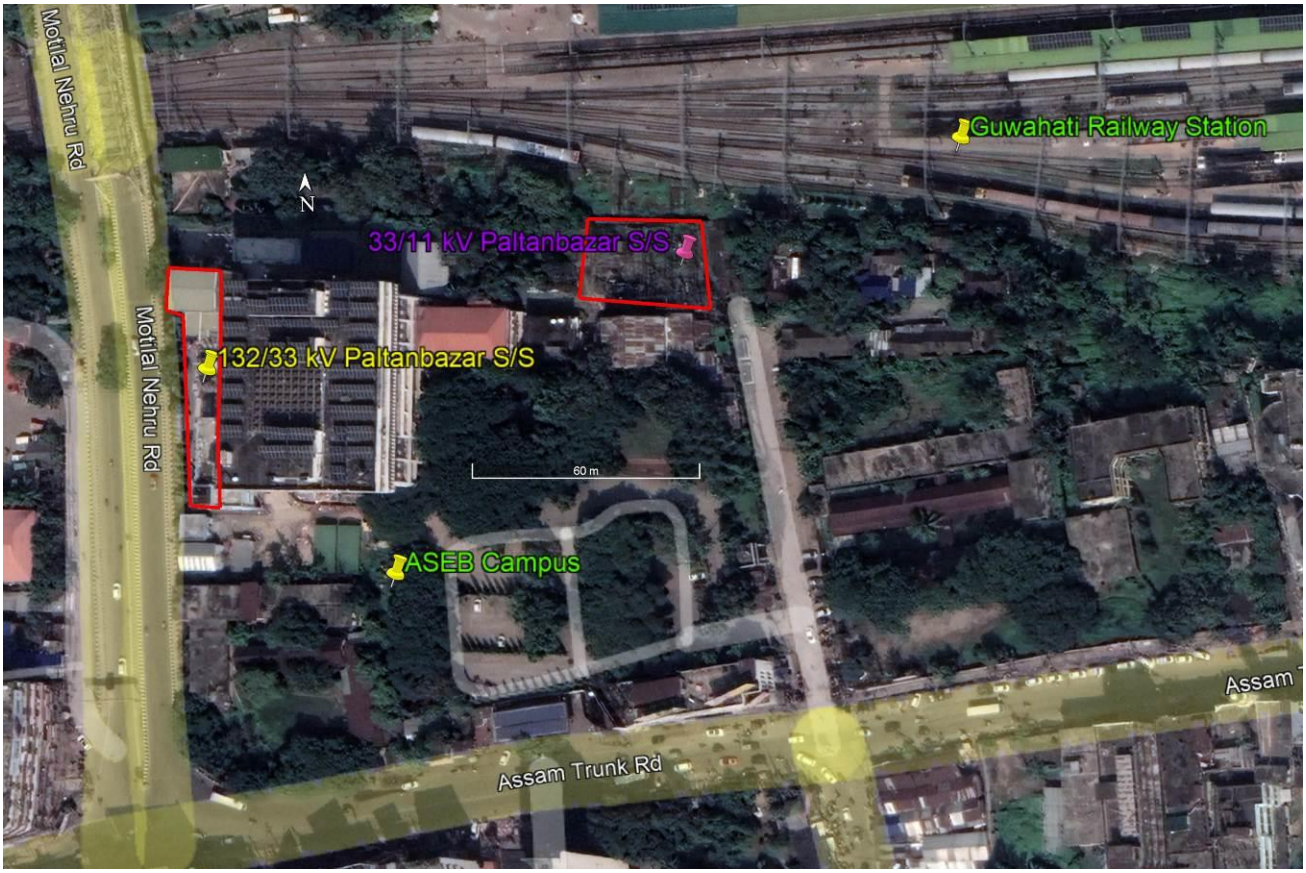
S. No.	Name of Substation	Earlier Identified Land as per IEAR	Finalized Land (Actual)	Reason for Change
A	**Transmission Substation**			
1	132/33 kV GIS substation at Guwahati Medical College (New)	In the campus of Guwahati Medical College. Coordinates 26°09’41.90’’ N, 91°45’ 48.89’’ E	Still in the campus of Guwahati Medical College. However, shifted 80 m towards south. Coordinates 26°09’39.14’’ N, 91°45’49.71’’ E	To bring the location near to existing road.
2	132/33 kV GIS substation at Paltan Bazar (New)	In ASEB campus at Paltanbazaar. Coordinates: 26°10’52.34’’ N, 91°44’45.80’’ E	In ASEB campus at Paltanbazaar. Coordinates: 26°10’52.34’’ N, 91°44’45.80’’ E	Remain Unchanged
B	**Distribution Substation**			
3	33/11 kV GIS substation at GS Road (New)	Inside Guwahati Flour Mill Complex, GS Road Coordinates: 26°09’47.17’’ N, 91°46’16.39’’ E	Around 450 m towards east from APDCL’s 33/11 kV Ulubari S/s on ASEB Road Coordinates: 26°10'3.82"N 91°45'37.00"E	Non availability of land at the earlier location
4	33/11 kV GIS substation at GMCH-2 (New)	In the campus of Guwahati Medical College. Coordinates: 26°09’39.44’’ N,	Still in the campus of Guwahati Medical College. However, shifted 150 m towards southwest. Coordinates:	To bring the location near to existing road and in the campus of New 132/33 kV GIS substation at GMC

S. No.	Name of Substation	Earlier Identified Land as per IEAR	Finalized Land (Actual)	Reason for Change
		91°45'53.89'' E	26° 9'39.07" N, 91°45'48.20" E	
5	33/11 kV GIS substation at Chabipool (New)	Near Athgaon, A.T. Road. Inside the campus of Guwahati Gosala at Athgaon. Coordinates: 26°10'17.01'' N, 91°44'33.51'' E	Adjacent to Shiv Mandir, Forest Gate, Khagen Mahanta Path, Hengrabari Coordinates: 26° 9'3.30" N, 91°47'41.59" E	Non availability of land at the earlier location
6	33/11 kV GIS substation at Arya College (New)	In the campus of B Baruah cancer Institute. Coordinates: 26°09'47.86'' N, 91°44'48.40'' E	Slightly moved, around 40 m towards north. At the T point where GMC Hospital Road meets with AK Azad Road Coordinates: 26° 9'49.33" N 91°44'48.33 E	To bring the location near to existing road.
7	33/11 kV substation at GMC (Strengthening)	NA	NA	NA
8	33/11 kV substation at Ulubari (Strengthening)	NA	NA	NA
9	33/11 kV substation at Judges Field (Strengthening)	NA	NA	NA
10	33/11 kV substation at Jail (Fancy Bazar) (Strengthening)	NA	NA	NA
11	33/11 kV substation at Paltanbazar (Strengthening)	NA	NA	NA
12	33/11 kV GIS substation at Tarun Nagar (AEC) (New)	Inside the campus of Assam State Khadi Board Coordinates: 26°09'03.96'' N, 91°47'35.56'' E	Inside the campus of Assam Engineering College Coordinates: 26° 8'29.32" N, 91°40'3.89" E	Non availability of land at the earlier location

Location of 132/33 kV GMCH GIS (New) and 33/11 kV GMC-2 GIS (New) Substations

132/33 kV GMCH GIS Substation (New)

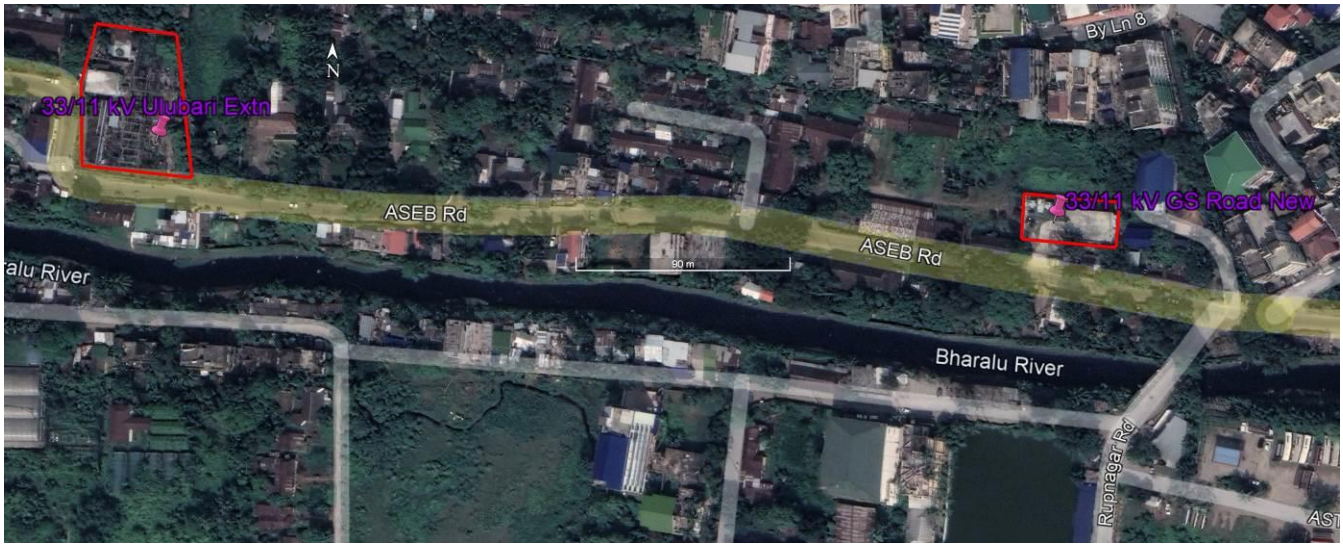
33/11 kV GMC-2 GIS Substation (New)



Location of 132/33 kV Paltanbazar GIS (New) and 33/11 kV Paltanbazar (Existing) Substations

132/33 kV Paltanbazar GIS Substation (New)

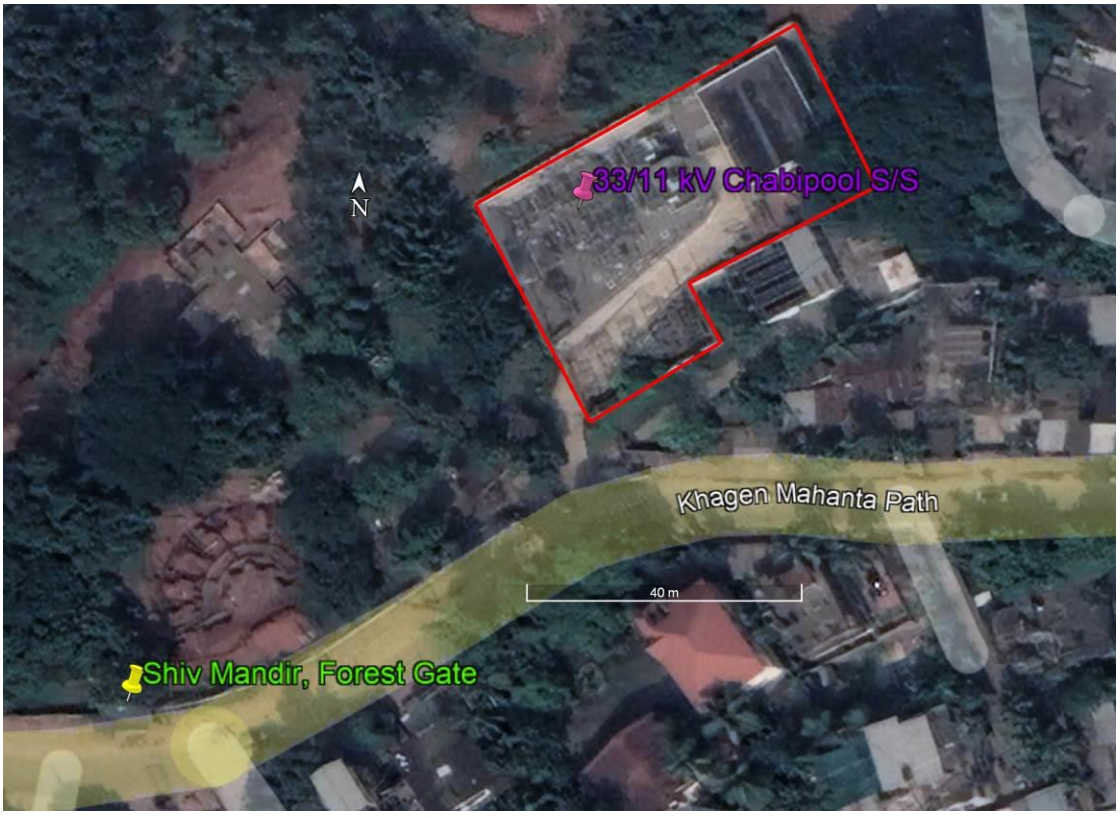
33/11 kV Paltanbazar Substation (Existing)



Location of 33/11 kV GS Road (New) and 33/11 kV Ulubari (Existing) Substation

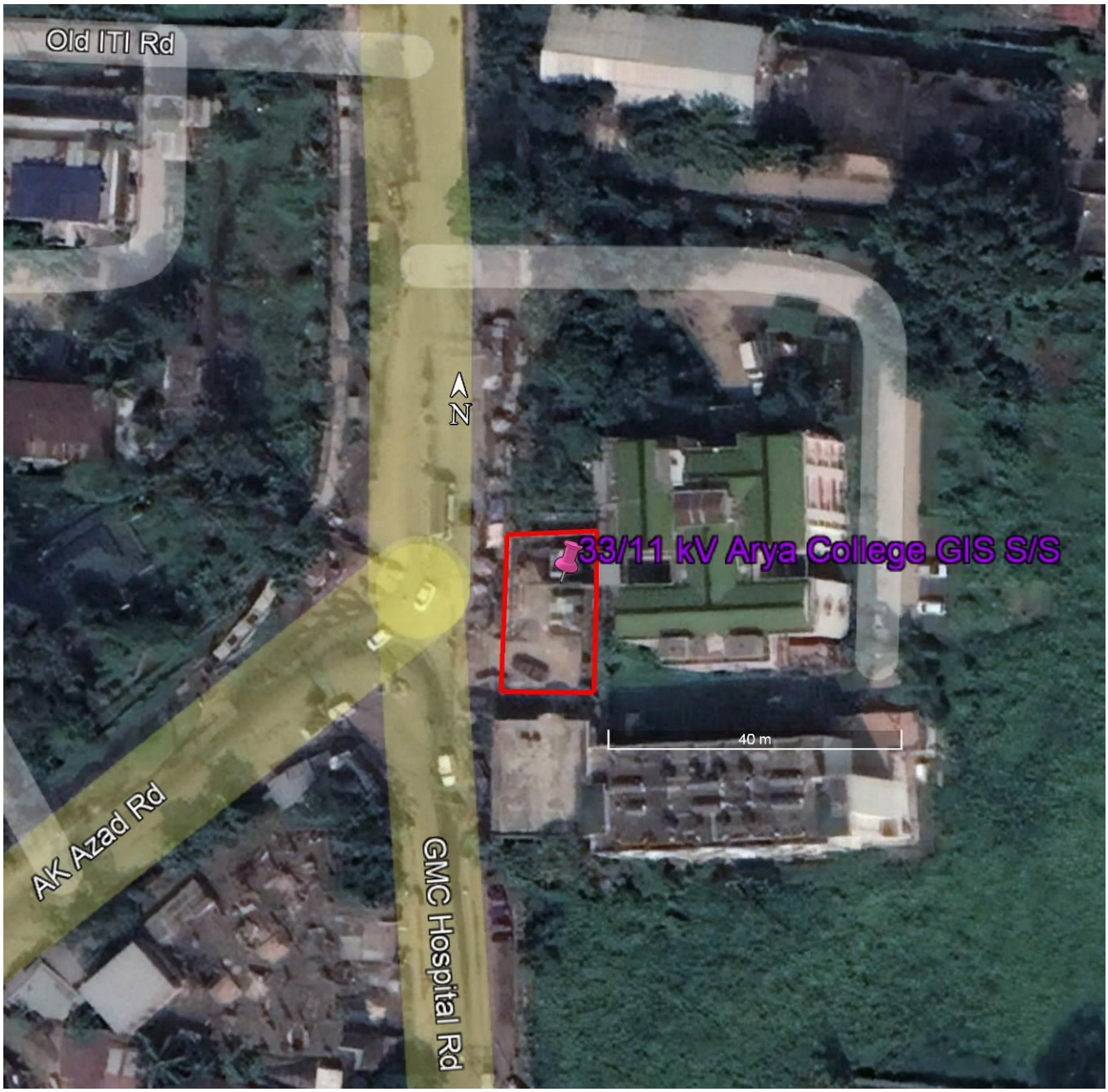
33/11 kV Ulubari Substation (Existing)

33/11 kV GS Road Substation (New)



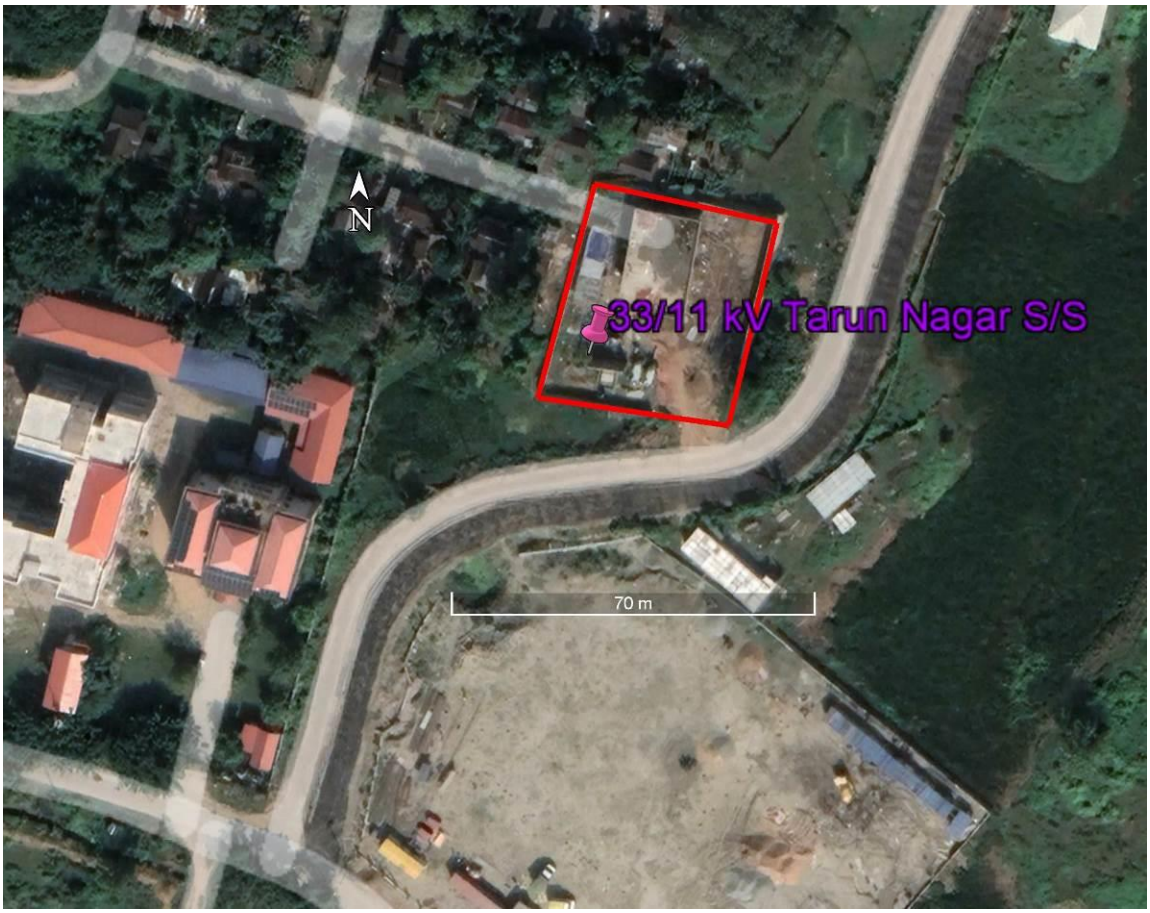
Location of 33/11 kV Chabipool (New) Substation

33/11 kV Chabipool Substation at Hengerbari (New) Substation



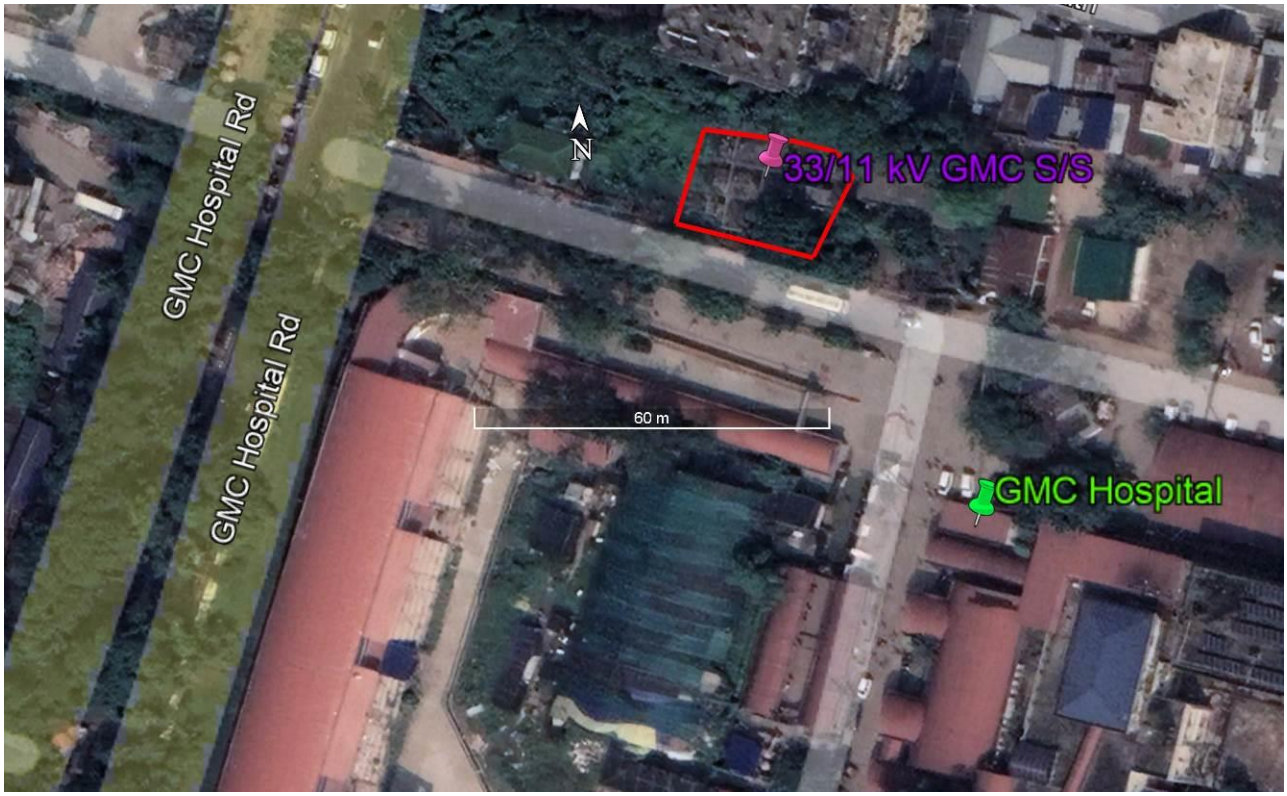
Location of 33/11 kV Arya College GIS (New) Substation


33/11 kV Arya College GIS (New) Substation



Location of 33/11 kV Tarun Nagar (AEC) Substation (New)


33/11 kV Tarun Nagar (AEC) Substation (New)



Location of 33/11 kV GMC Substation (Existing)

Location of 33/11 kV Judges Field Substation (Existing)

Location of 33/11 kV Jail Road (Fancy Bazar) Substation (Existing)

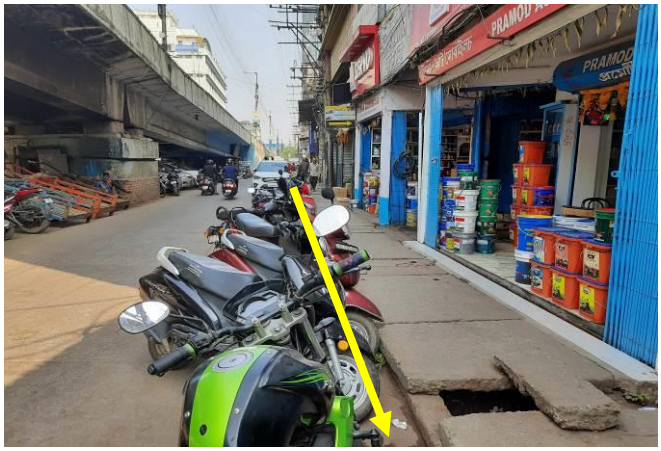
4.3 MAJOR FEATURES OF FINAL ROUTE

4.3.1 Transmission Line

Both the transmission lines are confined in Guwahati city (GMC area). Also, the lines are underground and are passing/ shall pass along the existing PWD road with sufficient width (**refer Figure 4.1 and 4.2**). The landuse pattern of the route can be termed as settlement/ builtup area. Kahilipara – GMCH 132 kV UG cable shall completely pass along the existing road, whereas Kamakhya – Paltanbazar 132 kV UG cable crosses railway line and Bharalu river at two different sections. The railway line crossing is underground while the Bharalu river crossing is overhead. Also, a small stretch of around 375 m of the Kamakhaya – Paltanbazar 132 kV line is overhead on the Nilachal hills starting from the bottom of the hill and ending at the 132/33 kV Kamakhya GIS substation. This land is under the possession of state govt.

There is no variation in the route length of Kamakhya – Paltanbazar 132 kV UG cable. There is variation in the final route length of the Kahilipara – GMCH 132 kV UG cable i.e. from 3 km to 6.4 km. The length was increased as the route was changed from partially overhead and partially underground to completely underground. Due to this change plantation area which was earlier falling under the overhead section of the line has been completely avoided. Besides all protected areas like National Parks, Wildlife Sanctuaries, Biosphere Reserve etc.; Natural habitats, IBAs, Wetlands etc. have also been completely avoided. Hence, earlier identified environmental impacts in IEAR/EMP have been reduced.

Route of Kahilipara – GMCH 132 kV UG Cable




Route of Kamakhya – Paltanbazar 132 kV UG Cable


Major Crossing enroute of Kamakhya – Paltanbazar 132 kV UG Cable

4.3.2 Distribution Lines

All the distribution lines are confined in Guwahati city (GMC area). Also, the lines are underground and are passing/ shall pass along the existing PWD road with sufficient width (**refer Figure 4.3 to 4.14**). The landuse pattern of the route can be termed as settlement/ builtup area. Out of the total 15 distribution lines, 11 distribution lines are completely passing/ shall completely pass along the existing road. Out of the balance 4 distribution lines, small section of each 132/33 kV Paltanbazar substation to 33/11 kV Judges Field substation and 132/33 kV Paltanbazar substation to 33/11 kV Jail Road (Fancy Bazar) substation line crosses railway line, whereas small section of each 132/33 kV GMCH substation to 33/11 kV GS Road substation and 132/33 kV GMCH substation to 33/11 kV Ulubari substation line crosses Bharalu river.

There are variations in the route length of 9 distribution lines. Main reason behind the change in route length is change in the location of 3 substations and due to further optimization of route during ground truthing/ detailed survey.


Route of GMCH to Ulubari and GMCH to GS Road Lines


Overhead Section of GMCH to Ulubari Line to Cross Nala


Route of GMCH to Chabipool Line


Route of GMCH to Arya College Line


Route of GMCH to GMC Line


Route of Paltanbazar to Judges Field Line

Route of Paltanbazar to Jail Road (Fancy Bazar) Line


Route of Jalukbari to Tarun Nagar (AEC) Line

Chapter 5 POTENTIAL ENVIRONMENTAL IMPACTS, EVALUATION AND ITS MANAGEMENT

5.1 INTRODUCTION

Environmental impacts of Transmission & Distribution (T & D) projects are not far reaching and are mostly localized to surrounding. However, T & D projects have some effects on natural and socio-culture resources. All possible measures have been taken during the finalization of route alignment as described in the earlier chapter for the proposed transmission/distribution system, however, due to the peculiarity of terrain where project is being implemented, some environmental impacts may be there. The explanations in brief with regard to possible environmental impact and measures taken to minimize the same are given in ensuing paragraph.

Prior to identifying the impacts, evaluation and its management, it is important to understand the method of underground cable laying. Trenchless Method with Horizontal Directional Drilling (HDD) will be applied for laying of UG cable in instant project. This method is selected based on the recommendation of PWD and considering the following benefits:

- Very less earth cutting/digging involved.
- Inconvenience to public is very less.
- Obstruction to traffic & road side structures/shops is least.
- Damage to Roads and existing utilities is least.
- Minimum environmental & social impacts

5.1.1 Initial Work Plan and Statutory Clearances

An initial work plan/sequence is prepared for the intended route where U/G cabling is planned. The route is divided preferably in 100 m sections and work plan for each 100 m section is finalized. Since, under the present scope, all the 17 nos. of U/G cabling are to be routed through the major roads of Guwahati area, therefore, work plan for night time with low traffic is envisaged. The plan for the whole route is submitted /intimated to the concerned utilities like PWD, PHE, Traffic, GMC, BSNL & other Telecom Authorities. Joint inspection of route is done with existing utility representatives to ascertain the depth and location of other structures like underground pipes/cables etc. Meanwhile, all the statutory permissions required for UG cabling is obtained prior to execution of work (Copy of sample permission letters are enclosed as **Annexure I**). The work plan intimation is also given to the shop owners, street vendors house owners etc. adjacent to the route along with the duration of work and the probability of temporary inconvenience caused to them.




5.1.2 Sequence of UG Cabling Activities & Safeguard Management Measures

The sequence of activities involved in 33kV underground cable laying along with related safeguard management measures are described below:

i. Excavation of entry (launch) pit and exit (reception) pit. Pit of dimension (2 x 2 x 3) m3 will be dug along the proposed route at an average distance of 100 meter. It serves as an inspection pit also as existing utilities and their depth can be determined from this. The excavated earth is kept beside the pit maintaining a safe distance and the area is properly barricaded. The pit is backfilled with the same soil after completion of work.


ii. HDD machine placement: Horizontal Deviation Drilling (HDD) Machine is placed near the entry pit with proper barricading.

iii. Drilling/Reaming: Drilling process start with piloting so as to trace the route. Bore holes are made with reamer of different diameter.

iv. HDPE Pipe Jointing: HDPE pipe are joined for 100 mt section by jointing kit and pipe are aligned properly.

v. HDPE Pipe Pulling: The pipes are pulled for 100 m.


vi. Backfilling of Pit and Shifting of Machine: The returning drilling fluids along with the slurry are collected in the entry (launch) pit. This slurry /mud is then disposed of at identified low lying areas with due consent from the owner. After pipes are pulled, pits are backfilled and levelled properly and thereby machine is shifted to a new place.



vii. Construction of Joint Box: Joint Box are placed at the proper jointing pit.

viii. Cable Jointing: Jointing of the cable is done inside the jointing box.

ix. Backfilling and covering of Joint box: After backfilling, Joint Box are covered with slab for safety.

5.2 IMPACT DUE TO PROJECT LOCATION

5.2.1 Resettlement

Land is required for

a) construction of substations and

b) erection of transmission line

5.2.1.1 Construction of Substation

The project component consists of establishment of two new 132/33 kV sub-stations at GMCH and Paltanbazar and five new 33/11 kV sub-stations at GMCH, GS Road, Chabipool, Arya College and Tarun Nagar. For the establishment of sub-stations fresh lands were either already in possession of AEGCL/ APDCL or Govt. land transferred/ donated. A total of 3.39 acre land has been secured for these sub-stations. Since, no involuntary acquisition was involved and fresh lands were secured only through private purchase there is no R & R and resettlement issues. The details are provided below in **Table 5.1**.

Table 5.1: Details of Land Securing Method for New Sub-stations

S. No.	Name of Sub-station	Land Area (acre)	Type of Land	No. of Land Owner	Land Securing Method
A	**Transmission Scheme**				
1	132/33 kV at GMCH (GIS)	0.83	AEGCL existing Land	NA	NA
2	132/33 kV at Paltanbazar (GIS)	0.63			
B	**Distribution Scheme**				
3	33/11 kV at GMCH-2	Part of 132/33 kV at GMCH (GIS) S/S	AEGCL existing Land	NA	NA
4	33/11 kV at GS Road	0.41	APDCL Land		
5	33/11 kV at Chabipool	0.36	Govt. Land		
6	33/11 kV at Arya College	0.13			
7	33/11 kV at Tarun Nagar	1.03			

Source: Detailed Survey of POWERGRID/ Contractor

5.2.1.2 Erection of Transmission Line

In respect of land required for the erection of transmission line, no permanent acquisition is envisaged. Land for tower and right of way is not acquired as existing activities can continue. Except for only a few towers (3 to 4) in the Kamakhaya – Paltanbazar 132 kV UG cable which

are required to be constructed overhead all the transmission and distribution networks are/ being constructed underground. Around 375 m of the overhead portion of the Kamakhaya – Paltanbazar 132 kV UG cable is on the Nilachal hills which starts from the bottom of the hill and ends at the 132/33 kV Kamakhya GIS substation. This land is under the possession of state govt. The only damage envisaged is clearing of vegetation for the tower footing and RoW while stringing the cable, that to temporary in nature. Since the towers are to be erected from hill top to bottom therefore impact on vegetation during stringing operation will be negligible. These almost negligible temporary damages/ disturbances is being compensated by the project under Compensation Plan for Temporary Damage (CPTD) to minimize the damages and provide compensation for temporary damages in consultation with the state government and/ or community.

5.2.2 Land Value Depreciation

It is evident that electric power being an enabler sector acts as a catalyst for the growth and development of areas having accessibility to it. Based on past experience land prices are generally expected to rise in the areas receiving power. Also, in the instant project proposed lines are to be constructed underground which will further minimize pressure/impact on land. Therefore, the value of land is not adversely affected to a significant degree. Moreover, distribution lines are primarily intended to provide power supply to populated area which boost the economic status as well as land price of the area, thus, outweighing possible negative impacts, if any.

5.2.3 Historical/Cultural Monuments/Value

Final routes of transmission and distribution line and sites for construction of new sub-stations don't involve any monuments of historical or cultural significance. However, during excavation, if any treasure, archaeological artifacts are found the same shall be intimated in writing to Collector/Archaeology department as per the provisions of Section-4 of "Indian Treasure Trove Act, 1878 as amended in 1949". The Collector shall initiate further action for its safe custody or its shifting to Treasury/ Secure place. The construction activity may be suspended temporarily during this process.

5.2.4 Encroachment into Precious Ecological Areas

In accordance with the policy of route selection, IA/Utility takes all precautions right from the planning stage itself to avoid routing of line through forest, protected areas like national park, wildlife sanctuary, biosphere reserve/ biodiversity hotspot and other ecological sensitive areas. In the instant case also the route of these lines have been aligned along the existing PWD roads and ecological sensitive areas are not involved along the corridors.

5.2.5 Line into Other Valuable Lands

Other valuable land includes land acquired, though temporarily, for tower base and width of RoW corridor. Since, the instant project is being implemented in the city area of Guwahati any adverse impact on agricultural land is not envisaged. The proposed lines will be laid underground along the city roads/existing power corridors and open area, hence, minimizing the adverse affects, if any. Further, for laying underground cable land is not acquired as per existing law. However, there will be only temporary hindrance to the local

inhabitants/shopkeepers/any other dwellers in proximity to the project site during the execution stage.

5.2.6 Interference with Other Utilities and Traffic

As per regulations, it is mandatory for IA/AEGCL/APDCL to seek clearance prior to construction from department of Railways, Telecommunications and wherever necessary from aviation authorities that are likely to be affected by the construction of transmission lines. In the instant case since proposed transmission and distribution lines are to be laid underground possibility of electrical interference is not envisaged. However, following clearance /permission from relevant authorities are being obtained before start of work.

5.2.6.1 Approval from PWD

The transmission and distribution UG cables are being laid along the existing PWD roads and excavation for inspection/entry pits for horizontal deviational drilling partially damages the road structure. Therefore, necessary permission from PWD Authority is required to be obtained prior to execution of work. The PWD officials after thorough inspection of routes and damage assessment submits necessary estimate to APDCL for restoration of the road which are required to be deposited to PWD. Subsequently, the necessary permission is granted to APDCL for starting of work.

5.2.6.2 Approval from Railway Authority

Since the transmission and distribution UG cables laying project involves rail track under crossing therefore necessary permission is being obtained from Railway Authority. After submission of detail plan & drawing for the proposed crossing location, the railway authority estimates the way-leave charges against the work and accordingly submit an estimate to APDCL. After depositing the way leave charges, necessary permission is granted to APDCL for execution of the work. Moreover, for any UG cabling work falling in the RoW of railway authority will require prior permission which will be obtained by POWERGRID on behalf of APDCL.

5.2.6.3 Intimation to Local Authority and Project Affected Person (PAP)

Although the transmission and distribution UG cables laying project is being executed along the existing PWD roads, but there will be temporary hindrance to the local inhabitants/shopkeepers/any other dwellers in proximity to the project site during the execution stage. Moreover, there are chances of temporary restriction to traffic flow and any local dispute arising from during project execution. Accordingly, free prior intimation to the PAP is being given by site officials of POWERGRID/APDCL prior to start of work. Also, the local regulatory authority like nearby police station/traffic department are intimated in advance with proposed work plan in the area.

5.2.7 Interference with Drainage Pattern

Since underground cable is being laid along the existing PWD roads through horizontal deviational drilling machine and inspection pit of dimension (2 x 2 x 3) m^3 is being dug along the proposed route at an average distance of 100 m there may be temporary hindrance to drainage for which adequate care is being taken to minimize the blockage by proper diversion

of its flow. Although, dewatering is not envisaged at most places, dewatering pump will be deployed to facilitate construction, if any, water seeps from local surface drains.

In order to avoid any interference with surface water drainage pattern such as river or nala, sections of transmission and distribution network is being converted to overhead and the transmission and distribution network is crossed through a newly constructed iron bridge. Since all proposed substations are located in plane terrain, no affect on drainage of the area is envisaged particularly with adequate arrangement of drainage built in all substation design.


Arrangement to Avoid Interference with Drainage in GMCH – Ulubari 33 kV UG Cable


Arrangement to Avoid Interference with Drainage in Kamakhya – Paltanbazar 132 kV UG Cable

5.3 ENVIRONMENTAL PROBLEMS DUE TO DESIGN

5.3.1 Escape of Polluting Materials

The equipment installed on lines and substations are static in nature and do not generate any fumes or waste materials. However, detailed specification with respect to equipment design and substation drainage and sewage design has been included in tender document to avoid any incidence of land and water contamination. Transformers have been designed with oil spill containment systems having sump of capacity of 200% of oil volume of largest transformer, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment. Substations include sewage disposal systems to avoid offsite land and water pollution. Apart from this, solid waste like packing materials, cables, aluminum conductor, sand, aggregate material, cements and steel generated during construction is carefully handled and removed from the sites periodically to avoid any contamination.

However, during horizontal drilling process a significant volume of mud/slurry (approx. 1616 m^3) is generated. As a management practice the returning drilling fluids along with the slurry are collected in the entry (launch) pit. The slurry is then collected & transported by Contractor in sealed trolley to the designated disposal sites. Also, slurry/mud is disposed to nearby low-lying areas with due consent from the owner. A sample consent letter obtained is enclosed as **Annexure II**.


Oil Spill Containment Systems 132/33 kV and 33/11 kV GMCH (new) S/S


Oil Spill Containment and Sewerage Systems at 33/11 kV GS Road S/S


Oil Spill Containment Systems at 33/11 kV Arya College and Tarun Nagar S/S


Oil Spill Containment and Sewerage Systems at 33/11 kV Chabipool S/S


Drainage within the 33/11 kV GMCH (New) S/S


Drainage within the 132/33 kV GMCH (New) S/S


Drainage within the 33/11 kV Arya College (New) S/S


Drainage within the 33/11 kV GS Road (New) S/S


Drainage within the 33/11 kV Chabipool (New) S/S


Drainage within the 132/33 kV Paltanbazar GIS (New) S/S


Under Construction Drainage within the 33/11 kV Tarun Nagar (New) S/S

5.3.2 Explosion/Fire Hazards

During the survey of line route, it is ensured that these are kept away from oil/gas pipelines and other sites with potential for creating explosions or fires. The underground cables, by its nature do not result in fire hazard, except for developing a fault in terms of puncture in the insulation, leading to direct earthing, which in turn trips the circuit breaker (either earth fault relay/over current relay/short circuit relay) at the respective substation within milliseconds. Apart from this, automatic tripping mechanism for transmission/distribution and substations are being installed so that line gets disconnected in fraction of seconds to prevent fire hazards.

Also, Explosion Prevention and Fire Extinguishing System (EPFES), a reliable, proven, proactive system are placed at 132/33 kV GMCH GIS and 132/33 kV Paltanbazar GIS substations to save transformer and reactors in different fault conditions which can lead to explosion and/or fire. It extinguishes external fire in bushing and/or radiator also, back up provision ensures nitrogen injection for fail safe operation. EPFES is designed to protect oil filled transformer/reactor from explosion and fire in all types of possible fault scenarios. In addition fire wall between transformers are also being constructed to prevent fire from spreading. Firefighting instruments including fire extinguishers are kept in appropriate place for immediate action in case of any fire hazard.

Fire Wall and EPFES at 132/33 kV GMCH GIS S/S

Fire Wall and EPFES at 132/33 kV Paltanbazar GIS S/S


Fire Wall at 33/11 kV GMCH and Arya College S/S


Fire Wall at 33/11 kV GS Road and Chabipool S/S

5.3.3 Erosion Hazards due to Inadequate Provision for Resurfacing of Exposed Area

In case of 132/33 kV substation foundation, excavation of soil to the tune of 7500 m^3 and for 33/11 KV sub-station, excavation of around 2000 m^3 is required. Construction of 132 kV and 33 kV underground lines takes place in elongated channel having width 2 m and depth 2 m. It is estimated that a total of approx. 235128 m^3 (52532 X 2 X 2 + 7500 X 2 + 5 X 2000) of excavated materials will be generated for construction of 52.53 km of Underground line, 2 no of 132/33 KV substation and 5 nos of 33/11 KV sub-stations proposed under present scheme. However, all the soil excavated for underground cables and substations construction are optimally (about 80-90%) utilized for backfilling and the remaining soil being spread evenly and compacted. Top soil disturbed during the development of sites are used to restore the surface of the platform. Infertile and rocky material are used as fill for substation. Hence, possibility of erosion of exposed area due to construction activity is negligible.

5.3.4 Environmental Aesthetics

Since the proposed lines will be laid underground there won't be any adverse impact on visual aesthetics of the localities.

5.3.5 Noise/Vibration Nuisances

The equipment installed at substation are mostly static and are so designed that the noise level always remains within permissible limits i.e. 85 dB as per Indian standards. Transformers with maximum noise emitting level of 75 dB and DG set with proper enclosures are part of equipment specification/ design criteria. Some noise is unavoidable during construction phase

like noise produced by concrete mixing equipment and excavators which are temporary. Further, construction works particularly during drilling activity has the potentiality to generate noise and vibration higher than the background noise. Though construction activities are to be undertaken in city area where noise levels are already at higher side measures like scheduling of activities during lean traffic period or at night, use of low noise producing equipment, provisions of sound and vibration dampers etc. are in place to minimize any direct impact to surrounding community. However, regular monitoring by IA/Contractors and due maintenance of equipment are ensured to keep the noise level well within the prescribed limit. Further, to contain the noise level within the permissible limits whenever noise level increases beyond permissible limits, measures like providing sound and vibration dampers and rectification of equipment are undertaken.

5.3.6 Blockage of Wildlife Passage/ Impact on Avifauna

The proposed transmission & distribution lines are to be laid underground in city area along the existing roads/power corridors and open spaces. Since there is no protected area or demarcated/ documented migration path of wildlife like elephant corridor existing near to subproject locations, hence, possibility of any disturbance to wildlife and bird hit/electrocution is not imminent.

5.4 ENVIRONMENTAL PROBLEMS DURING CONSTRUCTION PHASE

5.4.1 Uncontrolled Silt Runoff

As already explained, during construction limited quantity of excavated material is generated from inspection pits and horizontal drilling process for laying of underground cables. However, adequate measures are being taken to store excavated materials properly for refilling/resurfacing after construction is over. Further, excavation is avoided in rainy days. Hence, uncontrolled silt run off is not anticipated. However, during construction, precautions have been taken by contractors to avoid any such runoff of excavated material from the construction sites. Moreover, sub-stations are being constructed above the high flood level (HFL) by raising the foundation pad, therefore, are not prone to flooding/ erosive losses of soil. Also, since the project activity is confined to city boundaries which is plane area, no such impact is envisaged. Lastly, till date no instance of uncontrolled silt runoff is reported.

Levelled Surface at 132/ 33 kV GMCH GIS S/S


Levelled Surface at 132/ 33 kV Paltan Bazar GIS S/S


Levelled Surface at 33/11 kV Chabipool S/S

5.4.2 Nuisance to Nearby Properties

Laying UG cable along the existing PWD roads create temporary hindrance to the local inhabitants/ shopkeepers/ any other dwellers in proximity to the project site during the execution stage. Further, project execution temporarily restricts the traffic flow. In such cases, prior intimation to the project affected persons is provided by site officials of POWERGRID/APDCL prior to start of work. Traffic regulators like roper barricading around the pit, flag man are being placed at both ends and HDD machine, traffic diversion sign boards, night reflector are being placed during night time etc. are being undertaken to avoid any unforeseen incident/hindrance to the movement of traffic. Moreover, any adverse impact arising during the construction is temporary and no significant impact nearby habitat/property of neighboring community is anticipated apart from damage to road.

All construction sites of new sub-station are prohibited for general public both due to its separation/demarcation by boundary wall and also due to statutory provisions. Hence, any adverse impact arising during the construction of substation is temporary i.e. will last during construction phase only, and limited to the boundaries of proposed substation only and neither impacts nearby habitat/property nor health & safety of neighboring community. Boundary wall of all the substations have been almost completed, it is expected that the remaining boundary wall construction work will be completed soon.

Boundary Wall and Gate at 132/33 kV GMCH GIS Substation

Boundary Wall and Gate at 132/33 kV Paltan Bazar GIS Substation


Boundary Wall and Gate at 33/11 kV GS Road Substation


Boundary Wall and Gate at 33/11 kV Chabipool Substation


Boundary Wall at 33/11 kV Arya College Substation


Boundary Wall at 33/11 kV Tarun Nagar (AEC) Substation

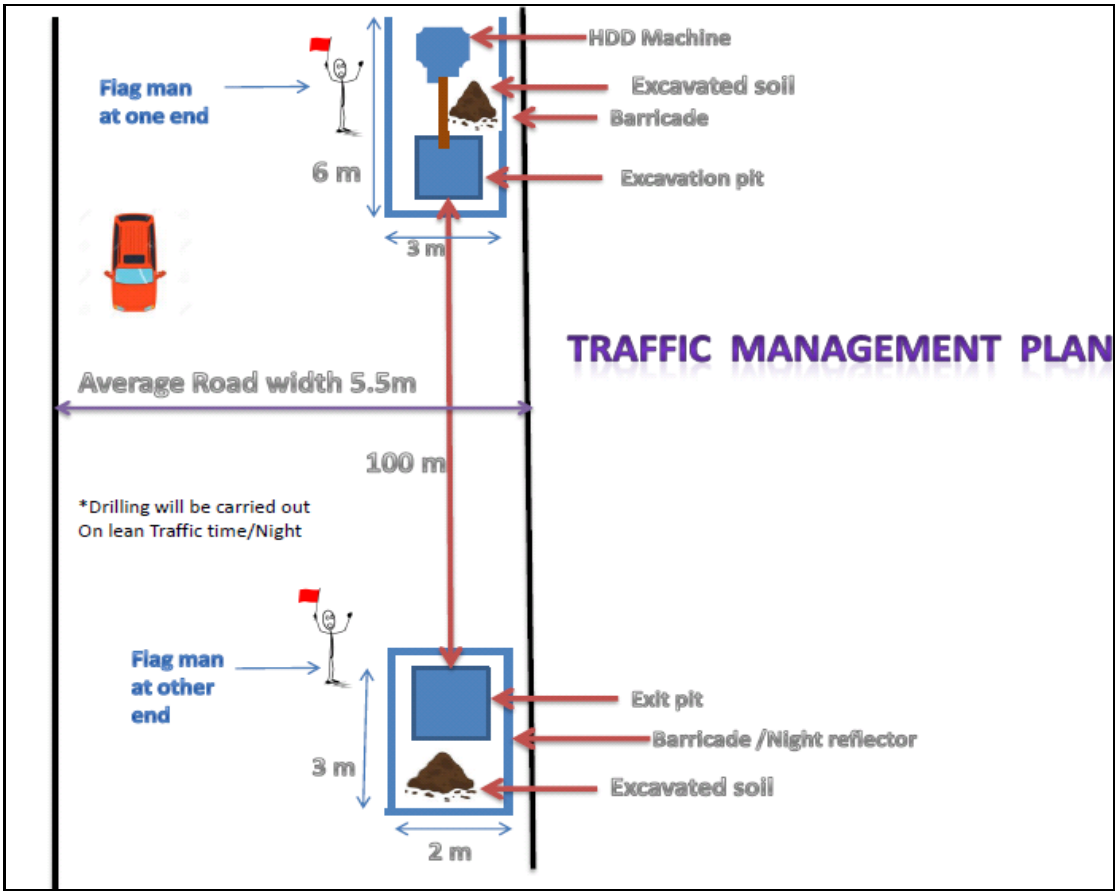
Barricading and Sign Board at Work Site

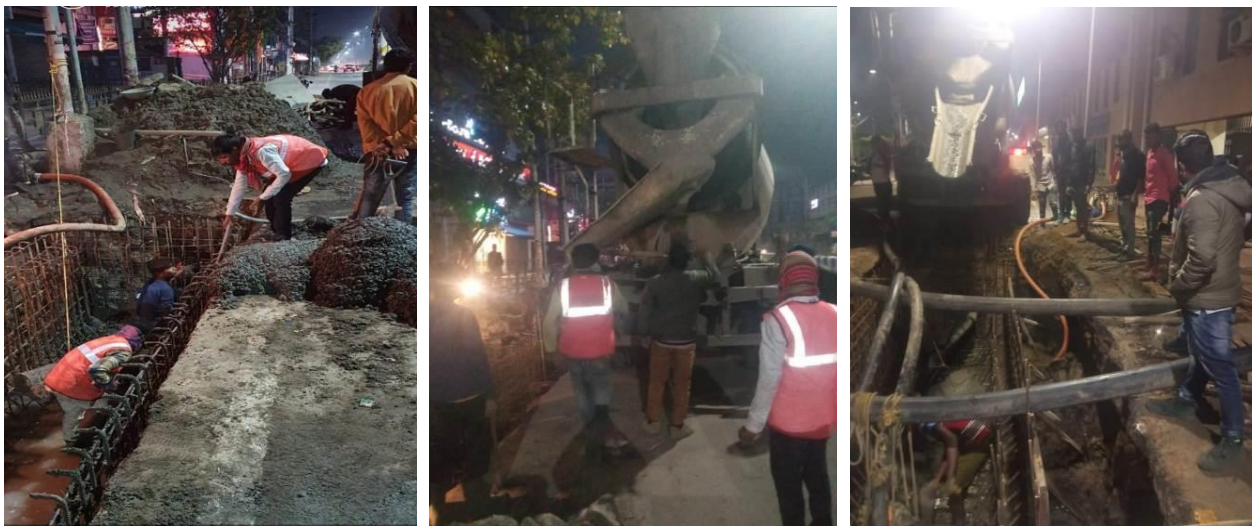
5.4.3 Interference with Utilities and Traffic and Blockage of Access Way

As already explained in preceding paras, as laying of UG cable is proposed along the existing PWD roads in city area there is temporary restriction to traffic flow during construction/drilling activity. Further, there is some temporary hindrance to the local inhabitants/shopkeepers/any other dwellers in proximity to the project site during the execution stage. However, prior intimation to the PAP are being provided by site officials of POWERGRID/APDCL prior to start of work. Further, all safety measures related to underground cable laying and installation are included in bidding document (Refer Sec VI, chapter 03 & Sec IV, chapter 15 of Technical specification respectively). Cable markers with

danger sign are being installed to indicate the location of all underground power cables to avoid any unforeseen incident during operation phase.

Besides, approval and permission from the Guwahati Traffic Department based on site specific traffic management plan are being obtained prior to execution of work. Traffic regulators like roper barricading around the pit, flag men are being placed at both ends and HDD machine, traffic diversion sign boards, night reflector are being placed during night time etc. are being undertaken to avoid any unforeseen incident/hindrance to the movement of traffic. Also help of local regulatory authority like nearby police station/traffic department during such activity is being sought. Refer **Annexure III** for site specific traffic management for Kahilipara – GMCH 132 kV UG cable. A schematic of traffic management is placed below.





Work Being carried Out During Night Time

5.4.4 Inadequate Resurfacing for Erosion Control

Since the proposed project is being implemented in city area with plain terrain and without any major excavation/earth cutting therefore, erosion shall not be an issue. Moreover, excavated earth will be reused for refilling/resurfacing immediately after construction is over. However, as a precautionary measure slope protection, retaining / RRM walls have been planned/ being implemented as erosion protection measure in the sub-stations mentioned in **Table 5.2**.

Table 5.2: Details of Slope Protection Measures

S. No.	Location of Substation	Measure Type	Purpose of Measure	Present Status
1	33/11 kV at Chabipool	RRM Wall	To avoid soil erosion	Completed
2	33/11 kV at Tarun Nagar	RRM Wall	To avoid soil erosion	Completed
3	In all sub-stations	Stone Pitching	To retain the soil	Provided

RRM Wall at 33/11 kV Chabipool Substation

RRM Wall at 33/11 kV Tarun Nagar Substation

5.4.5 Inadequate Disposition of Borrow Area

Since, proposed transmission/distribution lines are to be constructed underground, the volume of excavated soil will be fully utilized for back filling. In case of substations, generally the sites are selected in such a manner that the volume of cutting is equal to volume of filling avoiding borrowing of the area. However, in addition to the excavated material, excess soil was required for 132/33 kV GMCH GIS substation. Details of the excess soil required and source of the borrow area is given below in the **Table 5.3**. Prior to use, the soil sample were tested and found to be within the specified limits of PGCIL's Standard Field Quality Plan.

Table 5.3: Details of Borrow Area

S. No.	Name of Substation	Quantity Borrowed (cum)	Source of Borrow Area	Ownership of Borrow Area
1	132/33 kV GMCH GIS substation	9,100	Existing/ Registered Borrow Site	Govt. approved site

5.4.6 Protection of Worker's Health/Safety

All health & safety issues and their management aspects are integral part of project/contract specific safety plan **(Annexure IV)**, which is also part of contract conditions. Various aspects such as, work and safety regulations, workmen's compensation, insurance are adequately covered under the General Conditions of Contract (GCC), a part of bidding documents. Project is being executed as per the approved plan and is regularly monitored by dedicated Safety personnel. Moreover, for strict compliance of safety standard/plan a special provision as a deterrent has been added in the contract which provides for a heavy penalty of Rs.10 lakhs for each accidental death and Rs 1.0 lakh for each injury and is deducted from the contractor's payment and paid to the deceased/affected family **(Annexure V)**.

Additionally, work and safety regulations, workmen's compensation, insurance are adequately covered under the General Conditions of Contract (GCC), a part of bidding documents. The project authority ensures that all contractors are operating with valid labor license as per provision under section – 12(1) of the Contract Labour (Regulation & Abolition) Act, 1970 and also certified under Section- 7(3) of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 from Ministry of Labour & Employment. Besides, the contractors have obtained requisite insurance policy as per provisions of Employee Compensation Act, 1923 for its employed workforce. Sample copy of labor license and insurance policy for workers is attached as **Annexure VI**.

Efforts are being made to hire labourers locally to the extent possible, else same have been outsourced. The workers have been provided with PPEs such as boots and helmets. Mock drills such as fire safety, first aid etc. are conducted periodically to enhance the preparedness level of the workforce. Safety induction & awareness programme including HIV/AID are also conducted at every active site. Safety film for transmission project in local language is shown to workers for better awareness. Proper drinking water has also been provided. First aid boxes and provisions for treatment in case of emergencies were arranged locally/ nearby towns. All the precautionary measures to stop the spread the COVID19 pandemic were also taken.

Besides, the COVID-19 pandemic outbreak which not only created unprecedented situation all over world but has also impacted every aspects/ activities including project implementation. Since such pandemic was totally unforeseen/ unexpected, impacts associated with such events/situations were not been specifically included in existing EMPs. However, the existing safety plan and other contract conditions particularly related to labours do have provisions to deal with such extraordinary situations.

Since Govt. of India has enforced The Disaster Management Act, 2005 and Epidemic Diseases Act, 1897, w.e.f. March,2020 in whole of India which empower the GoI & State Govt. to take special measures and prescribe regulations in an epidemic to control the spread of the virus.

Provisions of these acts which are also enforceable on all provide that all the protocols of Govt of India and State Govt in respect of COVID-19 are to be mandatorily followed. Individual protocols also required necessary permission from Govt. Therefore, POWERGRID and all its contractors were duty bound to follow the instructions of government including closing of all construction activities during lockdown and the guidelines issued after detailed assessment regarding unlock which allows work to start with certain conditions. Based on this, POWERGRID's Corporate Safety Cell has also prepared a detailed guideline / plan to be followed at all its establishments, Construction sites and O&M during resumption of work in COVID-19 situation and site officials/contractors directed for ensuring strict implementation of the said guidelines. Besides, POWEGRID has provided food relief/exgratia payment to stranded workers and also financial assistance for improvement of health infrastructure/other medical facility/equipment. Measures undertaken at construction Sites in response to COVID-19 are:

- Arrangement of RT PCR /Rapid Antigen test for the labour as per requirement based on symptoms, on contact tracing, upon new workforce joining the existing workforce or upon completion of the quarantine period, as required.
- If the construction works have been stopped due to COVID conditions in the local areas and labour have to be kept idle, providing of food/amenities during such period are being ensured.
- Covid-19 positive labours have been kept in designated quarantine center and all expenditures are being borne by POWERGRID.
- Sanitizers, Face masks, Gloves and other COVID related PPEs are provided for construction workers along with employees. Thermal scanning is being done on daily basis.

Since the work is on halt therefore, compliance for protection of worker's health/ safety could not be carried out in detail. The only subproject where some work was being carried out was laying of 33 kV underground cable from 132/33 kV GMCH GIS (new) substation to 33/11 kV Chabipool (new) substation. Here the workers were seen working without wearing PPE kits. Upon enquiry it was informed that the workers were casual workers hired for a single day for a specific work i.e. tying of TMT iron bars for the construction of joint boxes. However, the site incharges have ensured full compliance of worker's health/ safety during construction time. No instance of any sort of mis happening with worker's health/ safety also justifies compliance of worker's health/ safety. Staff of IA i.e. PGCIL designated as Environment, Health and Safety Engineer also confirmed the compliance of worker's health/ safety during construction time and has maintained the records of site inspection (**Annexure VII**).

5.4.7 Waste Management Specific to Underground Cabling

During construction limited quantity of excavated material will be generated from inspection pits and horizontal drilling process for laying of underground cables. However, adequate measures shall be taken to store excavated materials properly for refilling/resurfacing after construction is over. The relevant waste management practice is delineated in the ensuing paragraph.

5.4.7.1 Waste Management Plan

i. Estimation of quantity of slurry generation: The volume of slurry generated during drilling period is approximately 1616 m^3.

Diameter of drilling hole	= 0.300 m
Total length of the drilling	= 22873 m
Volume	= $\pi r^2 h$
	= (3.14 X .0225 X 22873)
	= 1616 m^3

ii. Disposal Mechanism: The returning drilling fluids along with the slurry are collected in the entry (launch) pit. The slurry is then collected & transported by Contractor in sealed trolley to the designated disposal sites. Also, slurry/mud is disposed to nearby low-lying areas with due consent from the owner. In case of the instant UG cabling, adequate nos. of disposal sites are being identified by Contractor and POWERGRID for disposal of drilling mud/slurry in such a way that land development can be achieved with due consent of owner. As per previous experience, it is also seen that some residents voluntarily request for disposal of the mud to their backyard or low-lying areas their premises. The same has been done after getting written consent from them .

iii. Disposal of Excavated Earth: Excavated earth is backfilled in the pit, low lying areas and duly compacted to the satisfaction of the PWD authority after completion of work.

5.5 ENVIRONMENTAL PROBLEMS RESULTING FROM OPERATION

5.5.1 O&M Staff/Skills Less Than Acceptable Resulting in Variety of Adverse Effects

The O& M program is normally implemented by substation personnel for both the lines as well as substations. Monitoring measures employed include patrolling and thermo-vision scanning. The supervisors and managers entrusted with O&M responsibilities are intensively trained for necessary skills and expertise for handling these aspects. A monthly preventive maintenance program is carried out to disclose problems related to cooling oil, gaskets, circuit breakers, vibration measurements, contact resistance, condensers, air handling units, electrical panels and compressors. Any sign of soil erosion is also reported and rectified. Monthly monitoring reports are generated and appraised to Management, including a report of corrective action taken and a schedule for future action.

AEGCL/APDCL follows the best international practices while designing its system to maintain acceptable prescribed Electro Magnetic Field (EMF) level. The ICNIRP guideline for acceptable EMF level for the general public (up to 24 hours a day) is a maximum exposure level of 1,000 mG or 100 µT. Further, because of health and safety issues such as fire safety, safe voltages on metallic parts of buildings, and safety clearances to avoid flashover, the transmission lines do not pass directly over any residential properties and as such the potential for EMF effects to occur is further diminished.

Poly Chlorinated Biphenyls (PCBs) due to their high heat capacity, low flammability and low electrical conductivity were extensively used as insulating material in capacitors and

transformers. But after the finding that these PCBs are non-biodegradable and have carcinogenic tendency, their use in electrical equipment as insulating medium has been banned all over the world long back. However, it has been reported in some studies that chances of contamination of oil with PCB is possible. Keeping that in mind, AEGCL/APDCL has discontinued procurement of electrical equipment containing PCB more than 2 mg/kg and specification (as per IEC 61619 or ASTM D4059) is being stated in the tender document. Moreover, the subject scheme doesn't involve replacement of any PCB containing equipment, hence no disposal of such equipment is anticipated.

5.6 CRITICAL ENVIRONMENTAL REVIEW CRITERIA

5.6.1 Loss of Irreplaceable Resources

In the instant project transmission and distribution lines are being constructed underground, thus, there will be no loss of land. Moreover, the subject lines are not passing through any forest area; hence the problem of losing natural resources is not envisaged.

5.6.2 Accelerated Use of Resources for Short-term Gains

The subprojects are not making use of any natural resources occurring in the area during construction and are not utilizing the same during maintenance phases. The construction material such as UG Cable, HDPE Pipe, cement etc. are being sourced from factories while the excavated soil is being reused for backfilling to restore the surface. During construction of line, very small quantity of water is required which is met from nearby existing source or through tankers. However, for substation water requirement is met mostly by ground water derived by digging a borewell during construction as well as for operational stage. Moreover, provision of rain water harvesting in all proposed substations under the present scheme has been made to conserve precious water resources and enhance the ground water level. The aggregates used for construction are already available within sub-station area due to cutting, thus no new borrow area will be created. Hence, it may be seen that the activities associated with implementation of subject project shall not cause any accelerated use of resources for short term gain.

5.6.3 Endangering of Species

As described earlier, no endangered species of flora and fauna exist in the subprojects area getting affected and considering aerial nature of transmission and distribution project, there is no possibility of endangering/ causing extinction of any species.

5.6.4 Promoting Undesirable Rural-to Urban Migration

The subprojects will not cause loss of land holdings that normally trigger migration. It also does not involve resettlement due to acquisition of any private land holdings. Hence, there is no possibility of any migration.

5.6.5 Safety Hazard Associated with Submergence of Pit due to Flooding

The XLPE Underground cable used in the instant project is so designed that it can operate under extreme weather conditions like flooding. As long as water does not extend to the

exposed terminations, there is very little risk of failure or safety hazard due to flooding/submergence of pit Further, these underground cables, by its nature do not result in fire hazard, except for developing a fault in terms of puncture in the insulation, leading to direct earthing, which in turn trips the circuit breaker (either earth fault relay/over current relay/short circuit relay) at the respective substation within milliseconds.

5.7 PUBLIC CONSULTATION

Public consultation/ information dissemination is a continuous process starting with the project conception and continues during project implementation and even during O&M stage. Public is informed about the project at every stage of execution. During survey, AEGCL/ APDCL & POWERGRID site officials met people and informed them about the routing of transmission and distribution lines. Apart from this, Public consultation using different technique like Public Meeting, Small Group Meeting, informal Meeting have been carried out during different activities of project cycle. During such consultation, the public is informed about the project in general and in particular about the following:

- Complete project plan (i.e. its route and terminating point and substations, if any, in between);
- Design standards in relation to approved international standards;
- Health impacts in relation to EMF;
- Measures taken to avoid public utilities such as school, hospitals, etc.;
- Other impacts associated with transmission & distribution lines and AEGCL/ APDCL approach to minimizing and solving them;
- Compensation process.

Since temporary hindrance due to proposed project intervention is anticipated, regular communication/meeting involving one to one interaction with local inhabitants/ shopkeepers/other dwellers were carried out to disseminate information about project and adoption of EHS mitigative measures to be undertaken. Further, prior intimation to the affected persons were provided by site officials of POWERGRID / APDCL before to start of work. The process of such meeting/consultation shall continue during project implementation and even during O&M stage.

5.8 COMPLIANCE OF EMP

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mandatory requirements as stipulated in the IEAR. As many provisions of EMP related to construction contractor, EMP has been made integral part of contract document for its proper implementation by contractor/sub-contractor. Thus, the adherence to the clauses by the contractor is regularly monitored especially in respect of various implementation E & S measures including health and safety aspects. As part of the present study, mitigation measures as stipulated in the IEAR have been critically assessed/evaluated for compliance through physical inspection, verification of record/ documents/ drawing, interaction with project officials/contractor/ villagers/construction workers and PRA etc. Based on above, a detailed compliance status w.r.t. each identified impacts enlisted in EMP have been prepared and is presented in **Table 5.4**.

Table 5.4: Compliance of EMP

Cl. No.	Project Activity/ Stage	Potential Impact	Proposed Mitigation Measures	Compliance Status
1	Location of underground lines alignment & design	Change in land use and exposure to safety related risks	Setback of dwellings to line route designed in accordance with permitted level of power frequency & regulation of supervision at sites.	Complied with. Route alignment criterion is part of survey contract wherein all statutory Electrical clearances as stipulated under CEA's regulations, 2010 (Measures related to safety & electric supply) are considered/ ensured.
			Careful route selection to avoid existing settlements and sensitive locations	Complied with (Refer Section 4.2 and Section 5.2.4). Part of detailed alignment survey and design. All the lines are underground and runs along the existing roads. All socially sensitive areas including habitated areas avoided.
			Minimise impact on agricultural land	Not Applicable. Entire network is in urban area.
			Careful selection of site and route alignment to avoid encroachment of socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.)	Complied with (Refer Section 4.2, Section 5.2.3 and Section 5.2.4). No encroachment of any socially sensitive areas due to proposed substations.
			Appropriate route selection/siting of cable to avoid channel interference. Avoid, road, railway crossings.	Complied with (Refer Section 5.2.6 and Section 5.2.7). Efforts were made to avoid such crossing. However, at few places where it was unavoidable necessary management practice are in place and necessary permissions are being sought.
2	Line through Forest/Protected areas/ precious ecological area	Loss of precious ecological values/ damage to precious species	Avoid locating lines in forest land by careful site and alignment selection	Complied with Complied with (Refer Section 4.2 and Section 5.2.4). Part of detailed siting and alignment survey/ design. All such areas are avoided
			Avoid siting of lines through such areas by careful site and alignment selection (National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	
			Obtain statutory clearances from the Government	
			Minimize the need by using RoW wherever possible	
3	Noise related	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Complied with (Refer Section 5.3.5). Some noise is unavoidable. Noise levels'

Cl. No.	Project Activity/ Stage	Potential Impact	Proposed Mitigation Measures	Compliance Status
			Construction activities only undertaken during the lean traffic period/night time to comply national noise standards	measurements are done regularly by IA & Construction contractor. Noise level measured during site visits to all active sites found to be within permissible limits (<75 dB). Till date no grievance has been received in this regard
			Construction equipment to be well maintained.	
4	Escape of polluting materials	Environmental pollution	Proper disposal of slurry generated during drilling process to avoid water pollution.	Complied with (Refer Section 5.3.3 and Section 5.4.7.1). No dumping is observed. All overburden is managed optimally by reutilizing it as fill materials.
			Proper segregation and safe disposal of construction solid waste	
		Temporary blockage of utilities	Measure in place to avoid dumping of fill materials in sensitive drainage area.	
5	Lines through farmland	Loss of agricultural productivity	Use existing access roads wherever possible	Not Applicable. Entire network is in urban area
			Ensure existing irrigation facilities are maintained in working condition	
			Protect /preserve topsoil and reinstate after construction completed	
			Repair /reinstate damaged bunds etc after construction completed	
		Loss of income.	Land owners/ farmers compensated for any temporary loss of productive land as per existing regulation.	
6	Construction activities	Safety of local community	Ensure Site Specific Traffic Management Plan in place	Complied with (Refer Section 5.1.1, Section 5.1.2, Section 5.2.6 and Section 5.4.3). Site specific Traffic management Plan is in place. Excavated areas are barricaded and restriction to enter work site during construction have been strictly followed. Smooth traffic flow is ensured by project authorities/contractor in close co-ordination with local authorities wherever necessary. Till date no grievance has been received in this regard.
			Coordination with local communities for construction schedules, Barricading the construction area and spreading awareness among locals.	

Cl. No.	Project Activity/ Stage	Potential Impact	Proposed Mitigation Measures	Compliance Status
		Local traffic obstruction	Coordination with local authority/ requisite permission for smooth flow of traffic	
7	Trimming /cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Not Applicable. Entire network is underground and along the existing PWD roads.
		Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	
			Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	
			Construction workers prohibited from harvesting wood in the project area during their employment, (apart from locally employed staff continuing current legal activities)	
8	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Complied with (Refer Section 5.4.1). Substations are constructed above HFL.
9	Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Complied with (Refer Section 5.4.6). As assured by the IA.
10	Influx of migratory workers	Conflict with local population to share local resources	Using local workers for appropriate tasks	Complied with (Refer Section 5.4.6). Local workforces have been given preference based on skill levels.
11	Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices.	Complied with (Refer Section 5.4.2). Good construction practices with proper scheduling of construction activities observed in all active sites. No major deviation with respect to contract conditions by the contractor found/reported
			As much as possible existing access ways will be used	
			Productive land will be reinstated following completion of construction	
12	Inadequate siting of borrow areas	Loss of land values	Existing borrow sites will be used to source aggregates and no need to develop new sources of aggregates	Complied with (Refer Section 5.4.1, 5.4.4 & 5.4.5). Excavated soil used optimally for backfilling and distribution within the substations' boundary is adequate.

Cl. No.	Project Activity/ Stage	Potential Impact	Proposed Mitigation Measures	Compliance Status
13	Health and safety	Injury and sickness of workers and members of the public	Safety equipment's (PPEs) for construction workers	Complied with (Refer Section 5.4.6). As assured by the IA.
			Contract provisions specifying minimum requirements for construction camps	
			Contractor to prepare and implement a health and safety plan.	
			Contractor to arrange for health and safety training sessions	
14	Inadequate construction stage monitoring	Likely to maximise damages	Training of environmental monitoring personnel	More specific and periodic awareness/ training on IEAR, ESPPF etc. requirements for effective implementation/ monitoring of provisions of IEAR, ESPPF and contract conditions to achieve 100% compliance.
			Implementation of effective environmental monitoring and reporting system using checklist of all contractual environmental requirements	
			Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	
15	Electric Shock Hazards	Injury/ mortality to staff and public	Careful design using appropriate technologies to minimise hazards	Complied/ being complied. Used of technology like tripping line/substation in milliseconds in case of any hazards. Boundary and Security fences are maintained at each substation. Sufficient barriers with warning signages are maintained at appropriate places of line/substation. Further, regular awareness/ mock drill on electrical safety and other occupational hazards are being undertaken.
			Appropriate warning signs indicating hazards at work place	
			Electricity safety awareness raising in project areas	
			Fire emergency action plan and training given to staff on implementing emergency action plan	
16	Operations and maintenance staff skills less than acceptable	Unnecessary environmental losses of various types	Adequate training in O&M to all relevant staff of substations & T & D line maintenance crews.	Being complied. Regular trainings are being imparted to staffs engaged in O & M activity based on their skill at regular interval
			Preparation and training in the use of O&M manuals and standard operating practices	
			Staff to receive training in environmental monitoring of project operations and maintenance activities.	

5.9 CONCLUSIONS

It is vivid from the above discussion that all transmission & distribution line routes and substations location have been selected judiciously by considering the technical, environmental, socio-economic aspects. Though some changes in line length & route alignment have been observed in transmission /distribution lines as compared to IEAR scope but as a result careful route selection IA could able to avoid ecologically & socially sensitive areas including forest, protected areas, PCR etc. completely in all the lines and substations being implemented under this project.

The provisions of IEAR & EMP are being implemented at ground level and strict compliance by construction contractors is ensured through regular monitoring by IA. So far, no major impacts apart from earlier identified impacts are anticipated due to such changes in scope. Besides, all other applicable laws/rules/regulations of the country & funding agencies are being complied with and till date no violation/ penalty with respect to contravention of any regulations has been reported. During assessment, it has also been observed that so far, the project has achieved zero fatality with no major non-compliance of EMP/Contract provisions as stipulated in IEAR, which is an indicative of the strict vigil of the IA.

It has also emerged from the survey & PRA exercise that the PAPs were appreciative of the project and hoped that the power scenario would improve after commissioning of the project. Local people also benefited through project related employment that was being generated. However, following suggestions may be considered to further improve the safeguard measures and also enhance the environmental sustainability of project.

- During the construction phase, the implementing agency needs to ensure strict compliance of the contract provisions/EMP by Contractor especially in respect of workers health and safety.
- Along with labours, supervisors, engineers and Staff of Implementing Agency (IA) should also need to follow the health and safety precautions.
- Need of regular induction and training program for labours and engineers at all sites.
- Training for PMU staff regarding monitoring and implantation of EMP as proposed in IEAR.
- Records of labour registration, health checkup of labours and other working staff need to be maintained at all sites and strictly monitoring to avoid engagement of child labour.
- Training and awareness regarding cleanliness and solid waste disposal to maintain the hygiene in the labour camps and construction sites.
- Demarcation and protection for sites where work has been on hold due to various reasons to avoid accidents and runoff of excavated soil from construction sites
- Project staff of the implementing agency should be well versed with the contents of the IEAR so as to ensure proper compliance by the contractors.
- All the drainage provided in the substation area should be covered to prevent any accidents.

Overall, the commissioning of the project will augment the power distribution and availability in the region which will further catalyze economic activity and development of the area/region.

Chapter 6 MONITORING AND ORGANIZATION SUPPORT STRUCTURE

For smooth implementation of this project, following administrative and functional set up have been institutionalized for project implementation, review and monitoring etc.

6.1 ADMINISTRATIVE ARRANGEMENT FOR PROJECT IMPLEMENTATION

Central Project Implementation Unit (CPIU) - A body responsible for coordinating the preparation and implementation of the project housed within the IA's offices at Guwahati. The "Project-In-Charge" of IA & Head of each of the SPCU shall be a member of CPIU.

State Project Coordination Unit (SPCU) – A body formed by the State Utility and responsible for coordinating with IA in preparing and implementing the project at the State level. It consists of experts across different areas from the Utility headed by an officer of the rank not below Chief Engineer, from the Utility.

Project Implementation Unit (PIU) – A body formed by the IA, including members of Utility on deputation, and responsible for implementing the Project across the State, with its personnel being distributed over the work site/s & operating in close association with the SPCU/ CPIU. PIU reports to the State level "Project Manager" nominated by the Project-in-Charge of IA. The IA has a Core team stationed at the CPIU on a permanent basis, and other IA officers (with required skills) make visits as and when required by this core team. This team represents IA is responsible for all coordination with SPCU, PIU, within IA and MoP, GoI. CPIU also assists MoP, GoI in monitoring project progress and coordination with The Bank.

6.2 REVIEW OF PROJECT IMPLEMENTATION PROGRESS

To enable timely implementation of the project/subprojects, following committee has been set up to review the progress;

A. **Joint Co-ordination Committee (JCC):** IA and SPCU nominate their representatives in a body called JCC to review the project. IA specifies quarterly milestones or targets, which are reviewed by JCC through a formal monthly review meeting. This meeting forum is called as Joint Co-ordination Committee Meeting (JCCM). The IA convenes & keeps record of every meeting. MoP, GoI and The Bank join in as and when needed.

B. **High Power Committee (HPC):** The Utility in consultation with its State Government has constituted a High Power Committee (HPC) consisting of high level officials from the Utility, State/ District Administration, Law enforcement agencies, Forest Department, etc. so that various permission/ approvals/ consents/ clearances etc. are processed expeditiously so as to reach the benefits of the Project to the end consumers. HPC meets on bimonthly basis or earlier, as per requirement. This forum is called as High Power Committee Meeting (HPCM) and the SPCU keeps records of every meeting. Minutes of the meeting will be shared with all concerned and if required, with GoI and The Bank.

C. Contractor's Review Meeting (CRM): Periodic Review Meeting is held by officials of PIU with Contractors at field offices, State Head Quarters (PIU location) and if required with core team of IA at Guwahati. These meetings are called "Contractor's Review Meeting" (CRM). PIU shall keep a record of all CRMs, which shall be shared with all concerned and if required, with GoI and The Bank.

D. Review meetings are held among MoP, GoI, The Bank, State Government, Utility and IA, at four (4) months interval or earlier if needed, primarily to maintain oversight at the top level, and also to debottleneck issues that require intervention at GoI/ State Government level. Minutes of the meeting shall be prepared by IA and shared with all concerned.

6.3 E&S MONITORING

The arrangement for monitoring and reviewing of project from the perspective of environment and social management forms part of overall arrangements for project management and implementation environment. Environmental monitoring is a continuous process throughout the Project life cycle starting from site selection to construction and maintenance stage. As IA, POWERGRID endeavours to implement the project in close coordination with the respective state power utilities and departments. POWERGRID has been implementing the project based on the Implementation/Participation agreements that were signed separately between POWERGRID and the Power utilities.

The IA has appointed dedicated Environment Officer in each state including Assam to oversee the E&S management. Besides, AEGCL/APDCL has formed a separate cell at the corporate office level namely Environment and Social Management Cell (ESMC) headed by Director PMU for proper implementation and monitoring of environmental & social management measures. Apart from day to day E&S monitoring other major responsibilities are;

- Coordinating environmental and social commitments and initiatives with various multilateral agencies, MoEF&CC and Govt. of Assam.
- Coordination of all environmental activities related to a project from conceptualization to operation and maintenance stage.
- Advising site offices to follow-up with the state forest offices and other state departments for expediting forest clearances and other E&S issues of various projects.
- Providing a focal point for interaction with the MoEF&CC for expediting forest clearances
- Training of Circle and Site officials on E&S issues arising out of Transmission/Distribution projects and their management plan.
- Training of other departments to familiarize them with the ESPP document.

Additionally, Field In-Charge reviews the progress on daily basis and periodic review by higher management including review by Heads of SPCU and CPIU undertaken wherein apart from construction issues the environmental aspects of the projects are discussed and remedial measures taken wherever required. Besides, Periodic Contractor's Review Meeting (CRM) are being held by officials of PIU with Contractors at field offices, State Head Quarters (PIU location) and with CPIU at Guwahati for better co-ordination and resolution any pending issues. The World Bank mission team also visits various sites every six months to review the progress status including ground level implementation of safeguard measures. Any

observation/agreed action plan suggested by the Bank is religiously complied in time bound manner. Additionally, review meeting among MoP, GoI, The Bank, State Governments., Utility and IA being held periodically to maintain oversight at the top level and also to debottleneck issues that require intervention at GoI/ State Government level.

The Capacity building and Institutional Strengthening program of the IA is held intermittently to enhance the skills of the project officials. Besides, separate E&S training are also organized for Official of State Utility under Capacity Building & Institutional Strengthening (CBIS) programme. Further, State utility meetings between IA and AEGCL/ APDCL are held on a monthly/ bimonthly basis to assess the work progress and difficulties encountered in respect of land acquisition, RoW and compensation if any.

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mitigation measures as stipulated in the IEAR. Thus, the adherences to the clauses by the contractors are regularly monitored especially in respect of various implementations of E&S measures including health and safety aspects. Due to such strong institutional support structure coupled with monitoring mechanism in place, no major non-compliance was observed/reported during the implementation of projects till date. The project has so far had zero fatality which is indicative of the strict vigil of the IA. During the present study, it was observed that mitigation measures as suggested in IEAR are mostly complied with even though some gaps were found with respect to proper documentation and condition of labour camp at one of the DMS sub-station.

6.4 GRIEVANCE REDRESSAL MECHANISM (GRM)

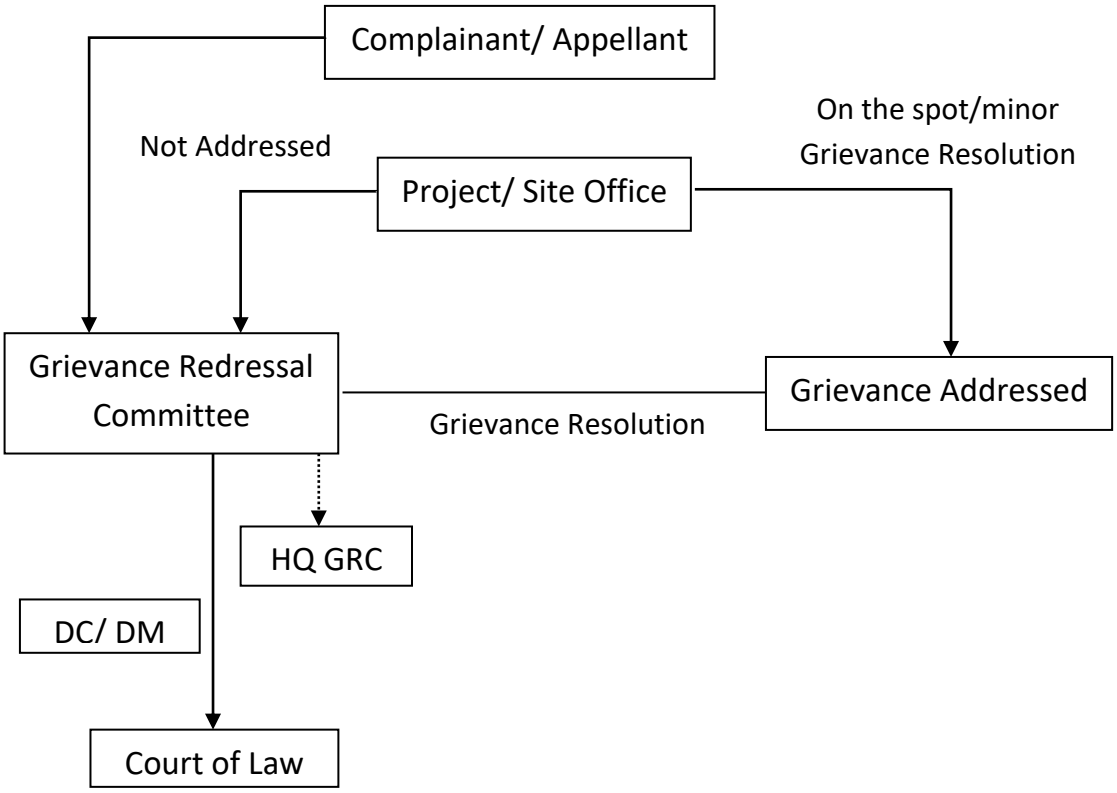
Grievance Redress Mechanism (GRM) is an integral and important mechanism for addressing/resolving the concern and grievances in a transparent and swift manner. In accordance with the provision in ESPPF, Grievance Redress Committees (GRC) have to be constituted in Assam both at the project/site level and at Corporate/HQ. This GRC is aimed to provide a trusted way to voice and resolve environment & social concerns of the project, and to address the concerns of the affected person/community in a time bound manner without impacting project implementation.

The Corporate/HQ level GRC has been constituted and notified which is headed by Director (PMU). Similarly, project level GRCs have been constituted for each transmission and substations covered under this project. Notifications of Corporate & Project level GRC are placed as **Annexure VIII**.

Apart from above, grievance redressal is in built in crop/tree/tower footing compensation process where affected persons are given a chance to place their grievances after issuance of notice by revenue officials on the basis of assessment of actual damages. Grievances received towards compensation are generally addressed in open forum and in the presence of many witnesses. Process of spot verification and random checking by the district collector/ its authorized representative also provides forum for raising the grievance towards any irregularity/complain. Moreover, AEGCL/ APDCL & POWERGRID officials also address to the complaints of affected farmers and the same are forwarded to revenue official for doing the needful, if required.

It may also be noted that concerns of public are addressed regularly through public consultation process which started from project planning to construction and will be continued in operation and maintenance also. Besides, many concerns/grievances from affected persons/public have been received by Site Offices which are also regularly tracked for early resolution. However, it has been observed that most of them were minor in nature and were resolved instantly and amicably by Site Officials after discussion & deliberation with affected person/ in consultation of revenue/district officials.

The flow chart showing Grievance Redressal Mechanism is presented below.



The above referred GRCs are meant to act as supplement/ complement and in no way substitute the legal systems, especially embedded within RFCTLARR Act 2013, The Electricity Act, 2003, and Right to Information Act.

6.4.1 Grievances Received & Resolved

Till date no grievances have been received at site during project execution. Details of complaints received up to February, 2022 are given in **Table 6.1**.

Table 6.1: Details of Complaints

S. No.	Name of the Subproject /State	Location	Name of complainants	Date of complaints	Main Issue of complaints	Status of complaint
A. Court Cases						
No Court Case has been registered so far against any subprojects under NERPSIP						
B. Written Complaints						
No written complaint has been received so far						
C. Verbal Complaints						
No verbal complaint has been received so far						

ANNEXURE I

Copy of Sample Permission Letters

SAMPLE TRAFFIC PERMISSION IN 33 KV U/G CABLE WORK

OFFICE OF THE DEPUTY COMMISSIONER OF POLICE, TRAFFIC GUWAHATI, ASSAM

Memo No.:- GTP / DCP, Traffic / 2020 / 10 / 767 , Dated: 01.12.2020

To

Shri M.K. Datta,
Chief Manager,
Power Grid Corporation of India Limited,
Monal Tower, 6th Floor,
G.S. Road, Dispur, Guwahati-6.

Sub:- Traffic permission for execution of 33 KV underground cable laying works from 132 KV GMCH substation(Bhangagarh) to Ganeshguri Fly Over under North Eastern Region Power System Improvement Project(NERPSIP).

Ref.:- NERPSIP/GHY/UG cables/Traffic/2020/ dated 19.11.2020.

Sir,

In inviting a reference to the subject cited above, I would like to state that clearance is given from this end, from traffic point of view, for execution of the above-mentioned works subject to the following conditions: -

1) The total distance to be covered for laying of 33 KV underground cable is approximately 5 kms; from 33/11 KV Chabipool substation, Hengrabari to 132 KV GMCH substation, Bhangagarh. Hence cable laying should be done by HDD Method, as far as possible, so as to maintain the smooth flow of traffic.
2) It should be ensured that the vehicular movement is not affected and hence the barricades for the said purpose should be restricted to the white-lines on the road-side. Under no circumstances they should encroach the motorable road.
3) The execution of the work should be preferably during the night hours and should be undertaken with the consent of the undersigned and the concerned In-Charge Traffic.
4) The work should be completed as fast as possible and there should not be any delay after starting.
5) The clearance is subject to being withdrawn at any time in case of deviation from the above conditions or in case of any exigency.

Yours faithfully

Deputy Commissioner of Police, Traffic,
Guwahati, Assam

2021/6/24 12:

RESTORATION OF DAMAGED ROADS BY POWERGRID IN EXISTING CABLE

GOVT. OF ASSAM
OFFICE OF THE EXECUTIVE ENGINEER, P.W.D WEST GUWAHATI TERRITORIAL ROAD DIVISION
FANCY BAZAR, GUWAHATI – 1

No.:- WGTRD/ BR -2/ 2801 Date: - 24/12/2020

To,

The Chief Manager,
Power Grid Corporation of India Limited
Guwahati

Sub:- Permission for Restoration of Damaged Road Surface caused by Laying of underground 33 KV U/G Cable by POWERGRID CORPORATION of India LTD at AEC Approach Road at Power House Point to Towards Assam Technical University at Alternative Approach Road to AEC road, with Provision of Earth work in excavation, providing inverted choke, GSB, WBM, SDBC etc. (At Open Trench & OFC Jointing Box).

Ref:- Your No. NERPSIP/Ghy/UG Cables/PWD/2020/ Dt. 05/12/2020

Sir,

With reference to the subject cited above, permission is granted for Restoration of Damaged Road Surface caused by Laying of underground 33 KV U/G Cable by POWERGRID CORPORATION of India LTD at AEC Approach Road at Power House Point to Towards Assam Technical University at Alternative Approach Road to AEC road, with Provision of Earth work in excavation, providing inverted choke, GSB, WBM, SDBC etc. (At Open Trench & OFC Jointing Box) as per the following terms and condition.

Terms and conditions:

1. The work will have carried out in consultation with the AEE PWD West Guwahati Territorial Road Sub Division III, Guwahati – 1.
2. Local Police station has to be informed before starting the work.
3. All precautionary measure i.e, barricade, sign board and caution board will have to be provided by your department.
4. Caution must be taken to cause least possible damage to the road while executing OFC work. Also it may be taken care to cause least possible disturbance to the vehicular and pedestrian.
5. While executing your work, if any underground cable or pipeline of other department is damaged by you the responsibility will be rest solely upon you.
6. The materials required for preliminary restoration work i.e, coarse sand/ sand gravel/ stone crusher dust etc will have to be collected at site prior to starting the work and excavated pit/ pits will have to be filled up properly just after completion of the OFC work.
7. The work must be completed within 30 days from the date of issue of this letter.

Yours Faithfully
23/12/2020
(Er. P.C Kakati)
Executive Engineer, PWD
West Guwahati Territorial Road Division
Fancy Bazar, Guwahati - 1

23/12/2020

Memo No. WGTRD/BR -2/ Date:-

Copy to:

1. The Superintending Engineer, PWD Guwahati ARIASP Circle, Guwhati – 21 for favour of kind information.
2. The Assistant Executive Engineer, PWD West Guwahati Territorial Road Sub Division for information.

(Er. P.C Kakati)
Executive Engineer,PWD
West Guwahati Territorial Road Division
Fancy bazar, Guwahati - 1

2021/6/24 12

SAMPLE DEMAND LETTER FOR RESTORATION OF DAMAGED ROAD DURING U/G CABLE WORK

GOVERNMENT OF ASSAM
OFFICE OF THE EXECUTIVE ENGINEER, P.W.D. (ROADS),
DISPUR TERRITORIAL ROAD DIVISION, BAMUNIMAIDAM, GUWAHATI-21

No. DTRD/1656 Date. - 12/04/2021.

To

The Chief Manager
Power Grid Corporation of India Ltd.
Monal Tower, 6th Floor, G.S Road
Dispur Post
Guwahati-06

Sub :- Submission of Estimate for the work " Restoration of damaged road surface caused by the laying of underground 33KV cable of POWERGRID Corporation of India Ltd from Narengi Substation to 33 KV Bamunimaidam Substation, under PWD Guwahati City Division II. Length Appx length 2.20 km.
Estimated Amount: - Rs. 80.86 L

Sir,

With reference to the above, I have the honour to submit herewith the above mentioned estimate for favour of your kind disposal.

Enclo:- 1 (One) No estimate in triplicate

Yours faithfully

23.5.21

Executive Engineer, PWRD
Dispur Territorial Road Division
Guwahati-21

Memo No. -
Date: -

Copy to: -

1. The Superintending Engineer, PWD, ARIASP Circle, Bamunimaidan, Guwahati-21 for favour of kind information.

Executive Engineer, PWRD
Dispur Territorial Road Division
Guwahati-21

ANNEXURE II

Copy of Sample Consent Letter

SAMPLE CONSENT LETTER FROM OWNER FOR DISPOSAL OF MUD FOR LAND DEVELOPMENT

Consent Letter

The undersigned hereby give my consent for disposal of mud in the designated area(...40 x 25 ft...) within my boundary premises situated at House No...6.....

...Rupnagar...Gali-32

The disposal of the mud is required for the purpose of land development in that area as per my own requirement.

M. No 9854970707

Signature of owner

opposit Power Grid Sub-Station, TSMC

Witness:

1.

2. Veerakumar Powergrid

ANNEXURE III

Site Specific Traffic Management Plan

132 kV GMC-Kahilipara EHV Cable Route

Traffic Safety Guidelines/Precautions along with its Methodology of Work

Introduction:-

The Double Circuit 132 kV Extra High Voltage cable's is going to be laid underground from 132 kV Guwahati Medical College GIS SS to 132 kV Assam Electricity Grid Substation ,Kahilipara via the GMC-Kahilipara hill side road along with maintaining proper and adequate safety measures at the time of excavation of works.

[A] Guidelines on safety in Road construction zones". With the following specifications.

1) Signage of retro-reflective sheet of high intensity grade.

2) Delineators in the form of cone/drums(300 to 500 dia and 1000mm high) made of plastic/rubber having retro-reflective red and white band , at a spacing of 5m along with a reflective tape to be tied in between the gaps of cones/drum for delineation dark hours and night.

3) Portable barricades using iron sheet with adequate iron railing painted with retro-reflective Paint.

4) Pavement marking.

5) Temporary fence/guard rail

6) Temporary concrete barriers including special pedestrian barriers

7) Other regulatory, warning and information signs

8) Red lantern or warning lights

9) Provision of flagmen.

10) Safety measures for workers engaged including PPE

11) First Aid and emergency response arrangements.

[B] The Traffic arrangement during construction shall be so as to ensure that.

1) Road users are accommodated through and around the construction zones safely with minimum of delays.

2) Traffic control and the construction activities are co-ordinate to provide for safe and efficient flow of traffic together with efficient, safe and rapid progress of the construction activity.

3) Where construction activities are taking place at multiple sites along the same or on parallel routes, construction activity and the movement of road users is co-ordinate to ensure that the total delay along the route or on signed alternative routes is within acceptable limits.

19/12/2020

Driver behavior is effectively influenced so that the speeds are reduced to the desired levels on the approaches to and within the construction zones

[C] Traffic safety and control

1) We shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the Roadway under improvement.

2) The barricades erected on either side of the carriageway / portion of the carriageway closed to traffic, shall be of strong design to resist violation, and painted with alternate black and white stripes. Red lanterns of warning lights of similar type shall be mounted on the barricades at night and kept lit throughout from sunset to sunrise.

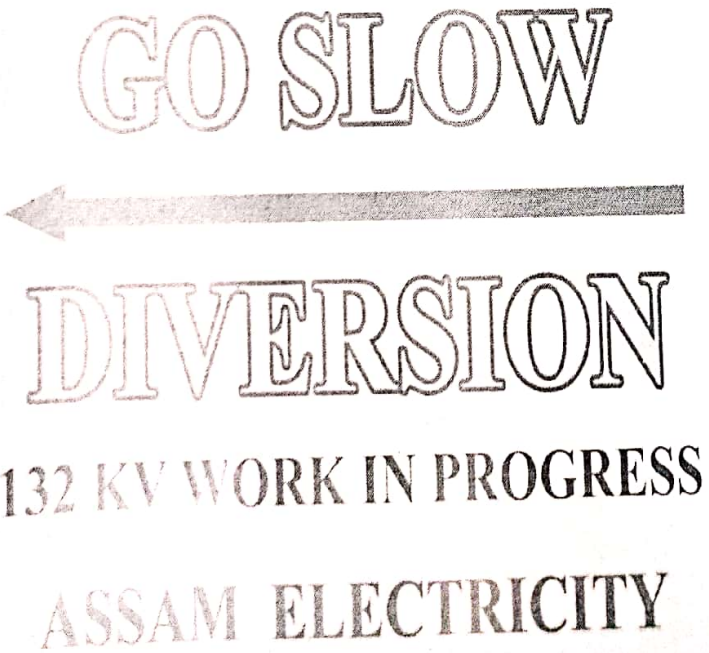
3) At the points where traffic is to deviate from its normal path (whether on temporary diversion or part width of the Carriageway) the channel for traffic shall be clearly marked with the aid of pavement markings, painted drums or Similar devices as per the directions of the Engineer. At night, the passage shall be delineated with lanterns or other Suitable light source.

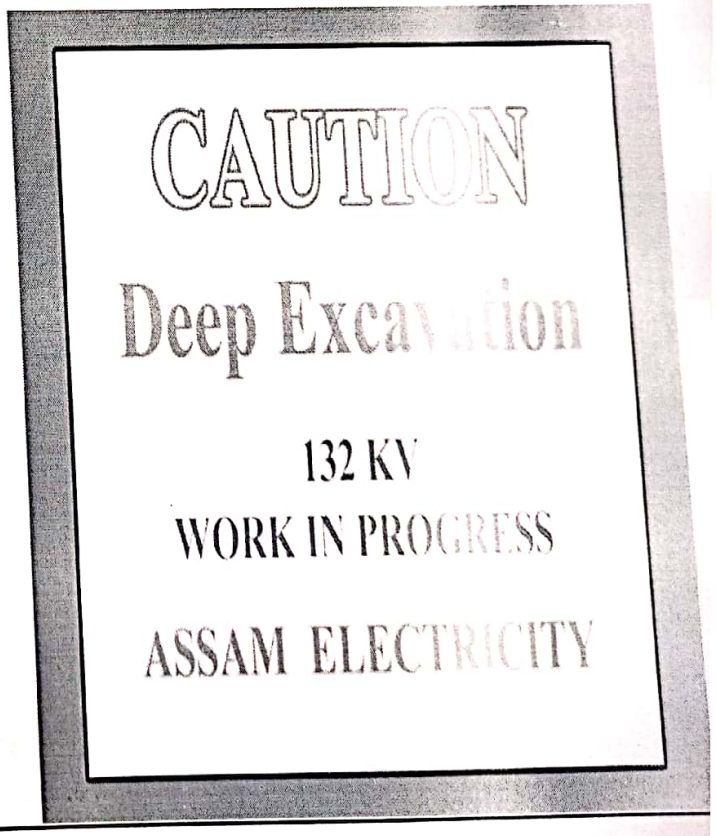
[D] Maintenance of Diversions and Traffic Control Devices

Signs, lights, barriers and other traffic control devices, as well as the riding surface of diversions shall be maintained in a satisfactory condition till such time they are required as directed by the Engineer. The temporary diversion road shall be kept free of dust, if necessary.

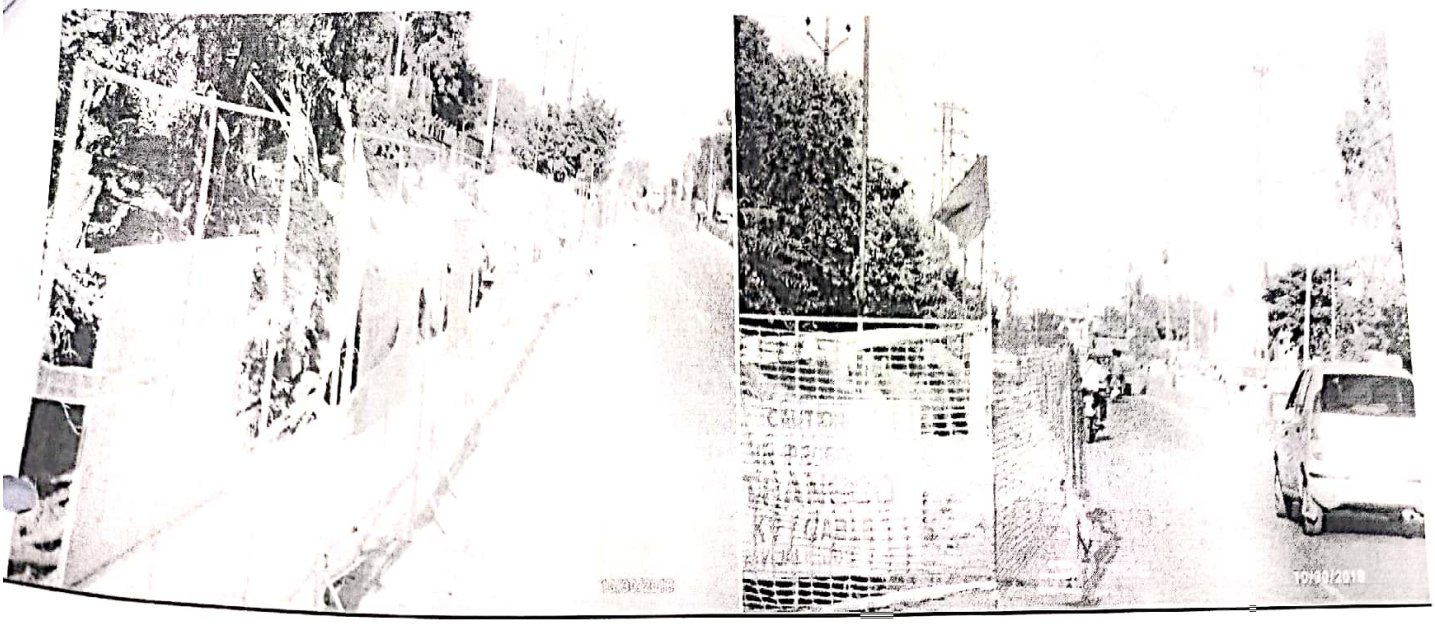
[E] Some Traffic Safety Symbols / Barricading will be used at site for our Excavation of 132 kV Cable Trench for Passing of Vehicles without any incontinence / hindrance.

1) **EHV Cable Trench Diversion Symbols.**





2) Barricading besides Cable Trench



3) Barricading at PIT EXCAVATION

18/12/2018

Methodology of Work along with its Spacing Required for placing of Cable Drums at Critical Locations / Narrow road.

1) The Double Circuit 132 kV Extra High voltage cables will be laid in Tre foil formation by "Open Cut Buried Trench Method " under the **160 mm dia HDPE Pipes in the entire GMC-Kahilipara Hill Road.**

2) The depth and width of the **Open Cut Buried Trench will be 1075 Mtr X 1000 Mtr**.

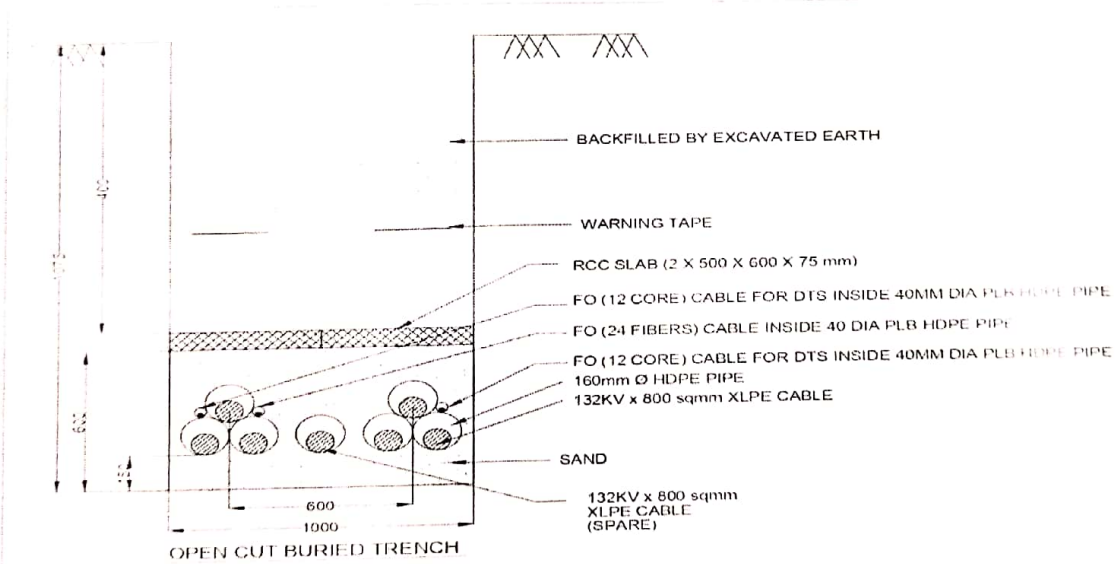
3) After the Excavation of the Desired Cable Trench, it will be filled with 150 mm Sand bed and after that 160 mm dia HDPE Pipes will be laid which will help the cables for getting damaged and once the HDPE Pipes are being placed inside the trench, the entire trench will be filled with filling sand and after that the trench will be covered by RCC Slab pertaining to the dimension 2 X 50 X 600 X 75 mm.

4) Once the RCC Slab are being placed the excavated trench will be provided by Warning tape for safety purpose and after that the entire trench will be backfilled by excavated earth.

5) The scope of work covers detailed route survey , planning , design , Engineering , manufacturing , Supply , transportation , delivery at site , unloading , handling , laying , installation (including civil works) , jointing , termination , testing and commissioning.

6) On one day the cable trench will be excavated hardly around 100 Mtr looking into the site condition because the entire Hill road is covered with Hard rock and at a stretch i.e. from one Joint bay to another joint bay 500 Mtr excavation will be done for laying of the 7 Nos of EHV Cables.

7) So, for completion of **500 Mtr of Open cut buried trench and laying of HDPE Pipes including backfilling will be taking around 25 Days.**

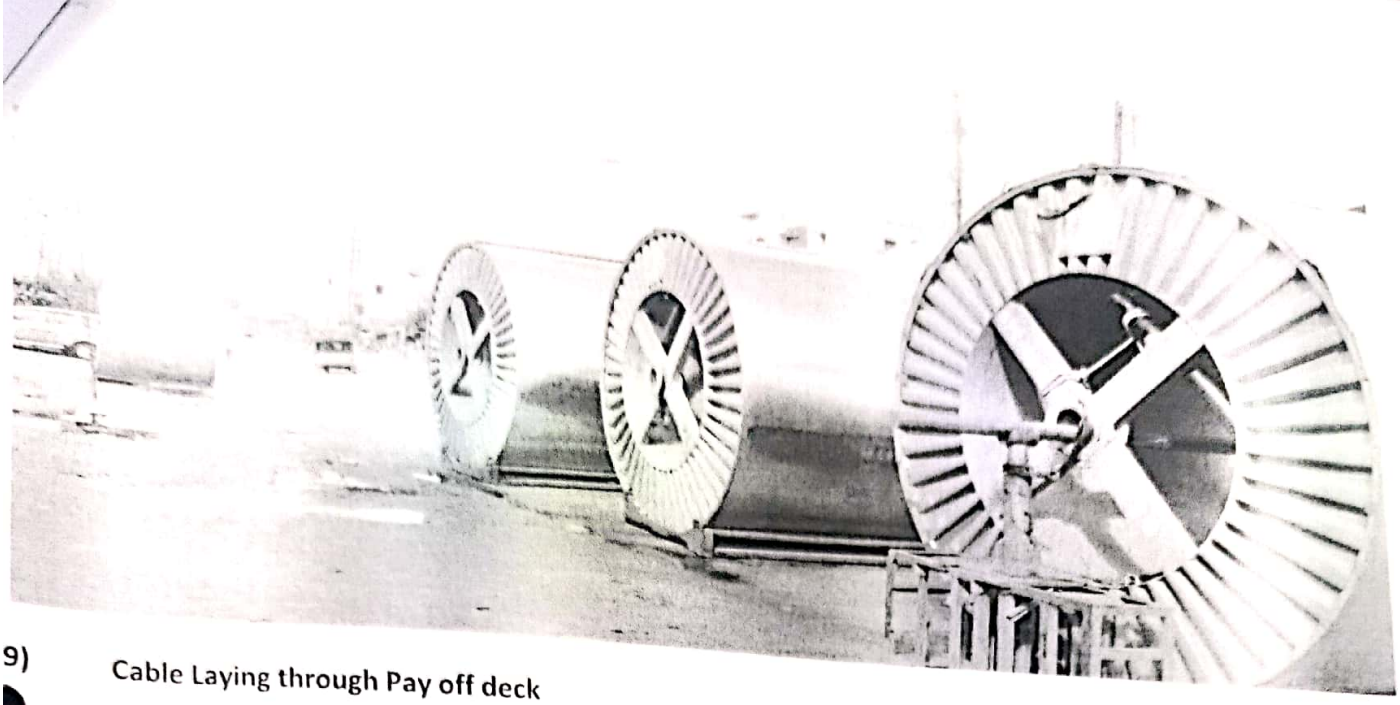


OPEN CUT BURIED TRENCH

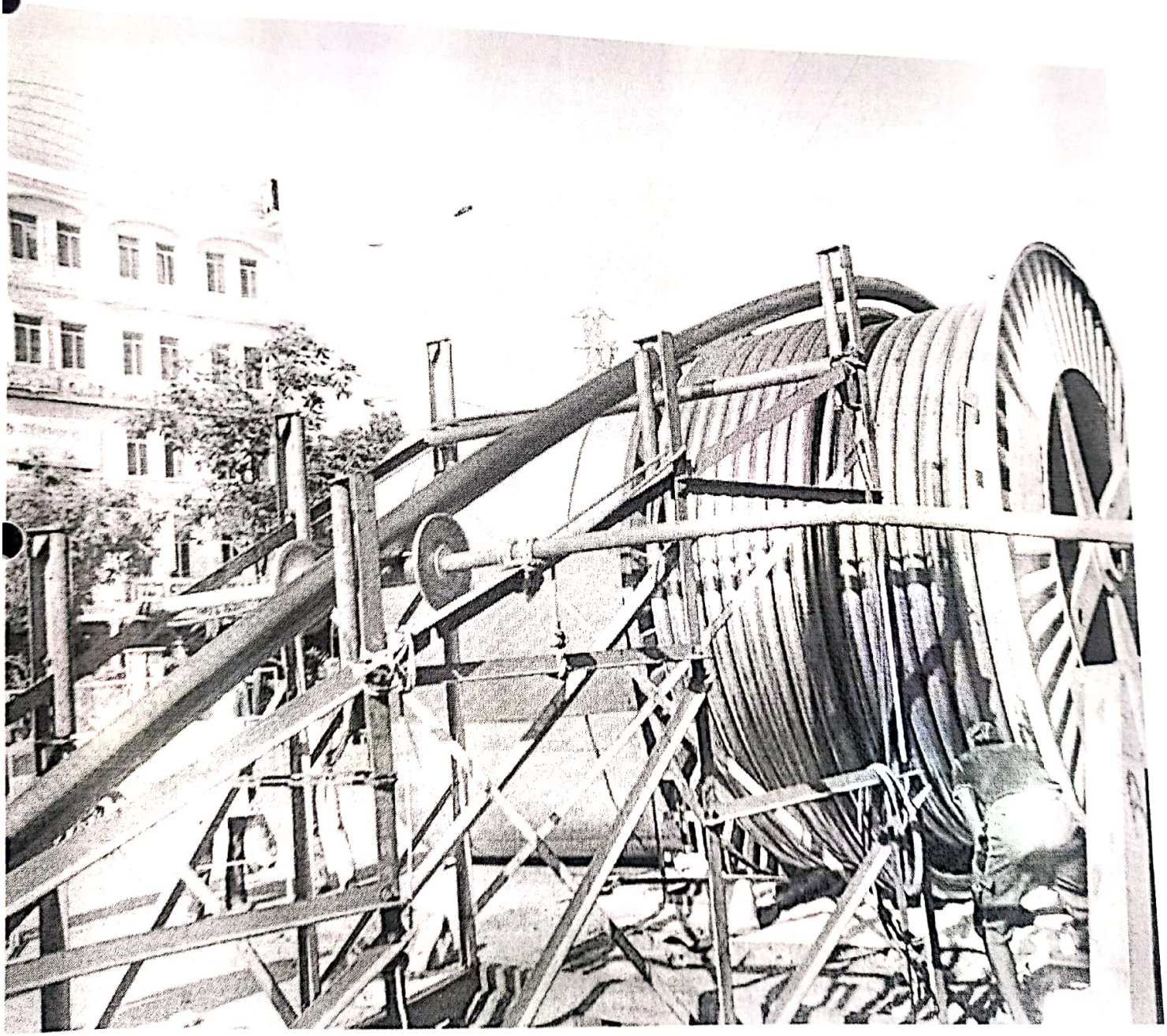
NOTES :-
1. ALL DIMENSION ARE IN mm
2. THE DEPTH OF THE CABLE TRENCH MAY VARY DUE TO HARD ROCK.

8) Placement of EHV Cable Drum along with Jack stand

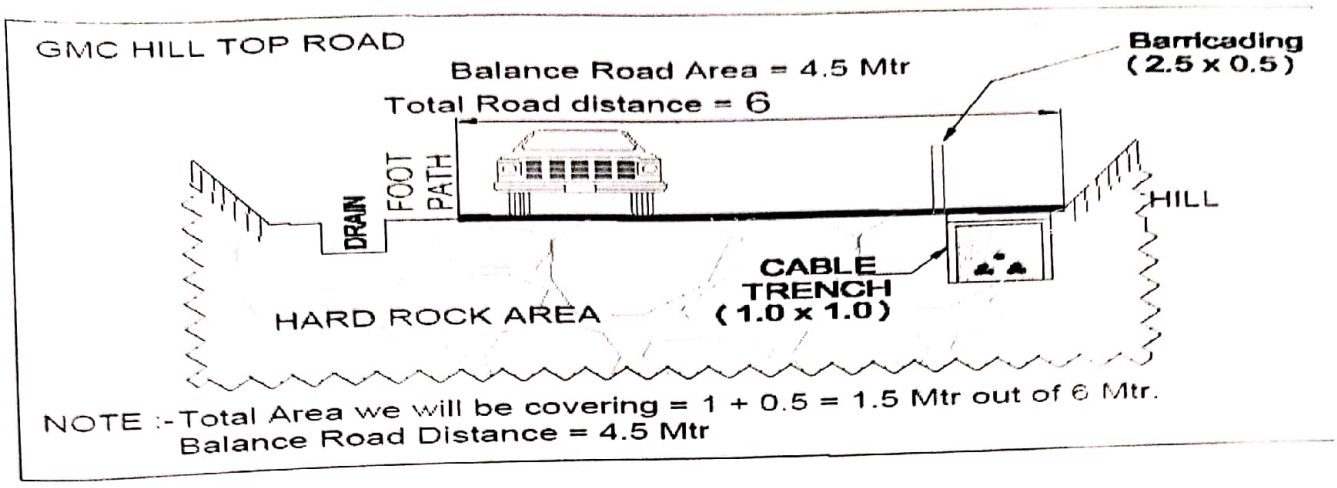
19/12/2022



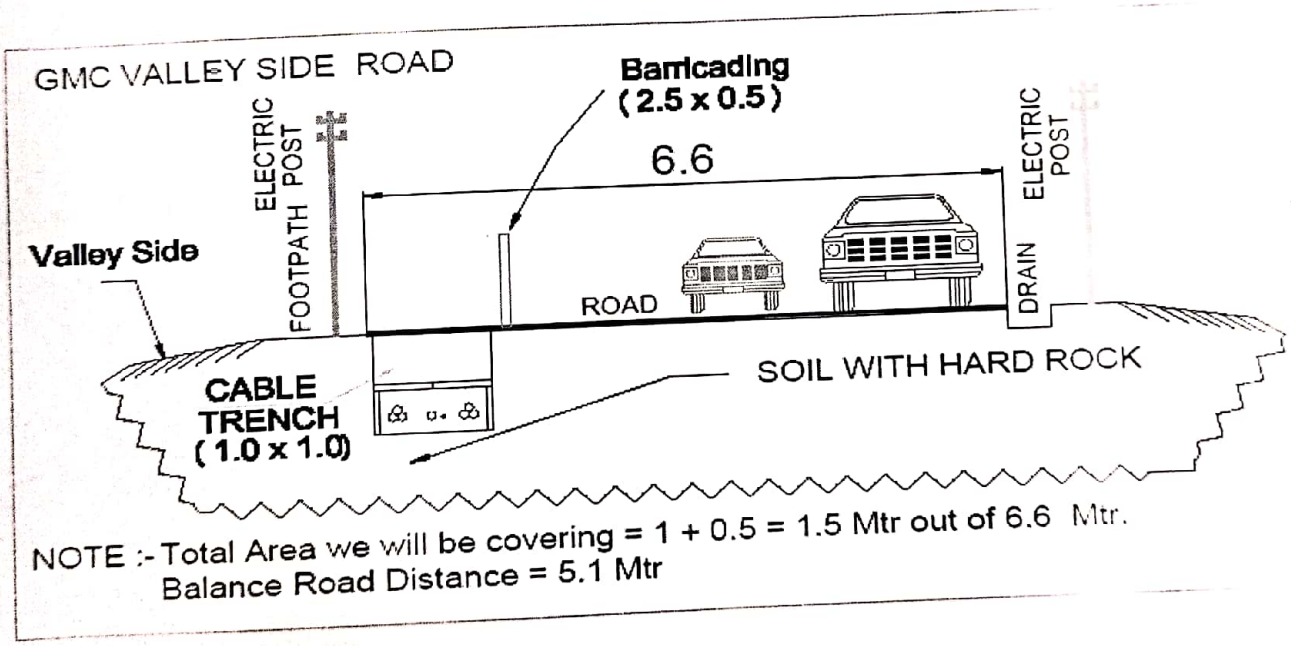
9) Cable Laying through Pay off deck



Locations showing Excavation of Buried Trench including placing of Barricading at Hill Top Road of width 6 Mtr



15) Locations showing Excavation of Buried Trench including placing of Barricading at Valley side Road of width 6.6 Mtr



ANNEXURE IV

Signed Copy of Safety Plan Submitted by Contractor

स्वच्छ भारत
एक कदम स्वच्छता की ओर

पावर ग्रिड कार्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड

रॉयल सेंटर, प्लेट नं-१०२, जि.एस.रोड़, उलुबाड़ी, गुवाहाटी - ७८१००७ दुरभाष - ०३६१-२४५८८४६
Royal Centre Flat No. 102, G.S. Road, Ulubari, Guwahati - 781007, Ph. : 0361-2458846
C/N : L40101DL1989GOI038121

Ref: NERPSIP/GHY/1024/18/300

Date: 15.02.2017

To,

Dy.Manager (Electrical)
M/s Techno Electric & Engg. Co Ltd
Chandrup House No: 2
Bishnu Path, Ghuramora Chariali
Guwahati

(Kind Attention: Mr. N.Chakraborty)

Ref: CA NO: CC-CS/94-NER/GIS-2673/1/G4/CA-I, CA-II & CA-III/5758, 5759 &5760 dated 06.05.2016

Sub: -Regarding acceptance of Safety Plan ASM SS-04 package.

Dear Sir,

With reference to above, this is to inform that, the Safety plan submitted vide letter no: 0718AS/PGCIL/NERPSIP/18 dated 04.01.2017 has been found in order. You are requested to abide by this safety plan throughout the construction period of ASM SS-04 package. Further, it is requested to submit the test certificates of the T&Ps mentioned in the annexures of the safety plan.

Thanking you.

Yours faithfully

(Jayanta Bardhan)
DGM (NERPSIP &ESMD) GHY

ENGINEERS & CONSTRUCTORS

TECHNO ELECTRIC & ENGINEERING CO. LTD.

Corporate Office :
1B, Park Plaza, South Block, 71, Park Street, Kolkata - 700 016, India
Tel. : (033) 4051-3000, Fax : (033) 4051-3326, E-mail : techno.email@techno.co.in
CIN : L40108WB2005PLC139595

Ref. : 0718AS/PGCIL/NERPSIP/18.
Date : 04.01.2017

The Dy. General Manager (NERPSIP & ESMD),
Power Corporation of India Ltd.,
Royal Centre No. 102,
G. S. Road, Ulubari,
Guwahati – 781 007, Assam.

Kind Attn.: Mr. J. Bardhan.

Sub. : Submission of safety Plan for GIS Substation Package ASM-SS04 for Assam associated with NERPSIP.

NOA Nos. : (1) CC-CS/94-NER/GIS-2673/1/G4/NOA-I/5758 dated 06.05.2016.
(2) CC-CS/94-NER/GIS-2673/1/G4/NOA-II/5759 dated 06.05.2016.
(3) CC-CS/94-NER/GIS-2673/1/G4/NOA-III/5760 dated 06.05.2016.

Dear Sir,

With reference to the above we are pleased to submit here with the safety Plan for GIS Substation Package ASM-SS04 for Assam associated with NERPSIP.

We request you to expedite approval of the safety Plan as early as possible.

Thanking you and assuring you of our best attention at all times

Thanking you.
Yours faithfully,
For, **TECHNO ELECTRIC & ENGINEERING CO. LTD.**

N. CHAKRABORTY
DY. MANAGER (ELECTRICAL)

Registered Office : P-46A, Radha Bazar Lane, Kolkata - 700 001, Tel. : (033) 4051-3000, Fax : (033) 4051-3326
Delhi Office : 508-509, Skipper Corner, 88, Nehru Place, New Delhi-110 019, Tel. : (011) 2643-1602, 3054-2900, Fax : 2644-6098, E-mail : delhi.techno@techno.co.in
Visit us at : http://www.techno.co.in

ANNEXURE V

Safety/Penalty Provisions in Contract Conditions

PC 21.3.4 **Replace the word *'may'* in line no. 10 with *'is'*.**

Addition of New Clauses (PC21.3.5, PC21.3.6) after GC 21.3.4

PC 21.3.5 **Packing**

The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit.

PC 21.3.6 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract.

PC 21.4 Replace the word '**materials**' in line no. 2 with '**Plant and Equipment**'.

Add the word '**including liabilities for port charges if any**' after the word '**clearance**' in line no. 3.

Addition of Sub-Clauses (PC22.2.3.1, PC22.2.3.2, PC22.2.3.3, PC 22.2.3.4) of GC 22.2.3

PC 22.2.3.1 Compliance with Labour Regulations

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the

employees of the Employer at any point of time.

PC 22.2.3.2 The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.

PC 22.2.3.3 If the Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non observance of the provisions stipulated in the notifications/ byelaws/Acts/ Rules/regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

PC 22.2.3.4 Salient features of some major laws applicable to establishments engaged in building and other construction works are indicated at **Appendix-I** to PC.

Addition of New Sub-Clauses (PC22.4.1 to 22.4.3 including its sub-clauses) of GC 22.4

PC 22.4.1 **Protection of Environment**

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986, and exceeding such quantity as may be specified by notification by the Central Government.

PC 22.4.2 (i) The Contractor shall (a) establish an operational system of managing environmental impacts, (b) carry out all the monitoring and mitigation measures set forth in the environment management plan attached to the Particular Conditions as **Appendix-II**, and (c) allocate the budget required to ensure that such measures are carried out. The

Contractor shall submit to the Employer (quarterly) semi-annual) reports on the carrying out of such measures.

(ii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement, and shall fully reinstate road / pathways, other local infrastructure and agricultural land to atleast their pre-project condition upon construction completion.

(iii) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable. and

(iv) The Contractor shall conduct health and safety programme for workers employed under the Contract and shall include information on the risk of sexually transmitted diseases, including HIV/AIDS in such programs.

PC 22.4.3 Safety Precautions

PC 22.4.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over, provide:

a) fencing, lighting, guarding and watching of the Works wherever required, and

b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

PC 22.4.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to THE EMPLOYER or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Engineer, as he may deem necessary.

PC 22.4.3.3 The Contractor will notify well in advance to the Engineer of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The Engineer shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Owner and the Owner shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Engineer's instructions.

Further, any such decision of the Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any cost implication to THE EMPLOYER or extension of work schedule.

PC 22.4.3.4 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948 and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

PC 22.4.3.5 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall

ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual and safety instructions and as per Guidelines/rules of THE EMPLOYER in this regard.

PC 22.4.3.6 Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer or by the person authorised by him.

PC 22.4.3.7 The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by the Contractor.

PC 22.4.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Engineer who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.

PC 22.4.3.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.

PC 22.4.3.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall

be used by the Contractor.

PC 22.4.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by THE EMPLOYER to handle such fuses, wiring or electrical equipment

PC 22.4.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Owner, he shall:

a. Satisfy the Engineer that the appliance is in good working condition;

b. Inform the Engineer of the maximum current rating, voltage and phases of the appliances;

c. Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.

PC 22.4.3.13 The Engineer will not grant permission to connect until he is satisfied that;

a. The appliance is in good condition and is fitted with suitable plug;
b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

PC 22.4.3.14 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

PC 22.4.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Engineer and a permit to work shall be issued by the Engineer before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to he provided by the Contractor to

electricians/workmen/officers.

PC 22.4.3.16 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.

PC 22.4.3.17 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety Officer. In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.

The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Engineer with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

PC 22.4.3.18 In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.

PC 22.4.3.19 The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Engineer within 3 days

of such stoppage of work and decision of the Engineer in this respect shall be conclusive and binding on the Contractor.

PC 22.4.3.20 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para GCC 22.4.3.19 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

PC 22.4.3.21 It is mandatory for the Contractor to observe during the execution of the works, requirements of Safety Rules which would generally include but not limited to following:

Safety Rules

a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.

b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.

d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial location.

e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

f) There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.

g) The staircases and passageways shall be adequately lighted.

h) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.

i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.

j) Requirements of ventilation in underwater working to Licenced and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

k) In case of rock excavation, blasting shall invariably be done through Licenced blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

PC 22.4.3.22 The Contractor shall follow and comply with all THE EMPLOYER Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservations. In case of any discrepancy between statutory requirement and THE EMPLOYER Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.

PC22.4.3.23 If the Contractor fails in providing safe working

environment as per THE EMPLOYER Safety Rules or continues the work even after being instructed to stop work by the Engineer as provided in para GCC 22.4.3.19 above, the Contractor shall promptly pay to THE EMPLOYER, on demand by the Owner, compensation at the rate of Rs.5, 000/- per day of part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place causing injury to any individual, the provisions contained in para GCC 22.4.3.24 shall also apply in addition to compensation mentioned in this para.

PC 22.4.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by THE EMPLOYER or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors or THE EMPLOYER employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with THE EMPLOYER, which will be passed on by THE EMPLOYER to such person or next to kith and kin of the deceased:

a.	Fatal injury or accident causing death	Rs. 1,000,000/- per person
b.	Major injuries or accident causing 25% or more permanent disablement	Rs. 100,000/- per person

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with THE EMPLOYER and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with THE EMPLOYER, such

amount shall be recovered by THE EMPLOYER from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

PC22.4.3.25 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Owner and no accident occurs then THE EMPLOYER may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

PC22.4.3.26 The Contractor shall also submit 'Safety Plan' as per proforma specified in Section IX: Contract Forms, Part-3 of Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Engineer In-Charge for its approval within 60 days of award of Contract.

Further, one of the conditions for release of first progressive payment / subsequent payment towards Services Contract shall be submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Engineer In-Charge.

PC 22.6 Emergency Work (GC Clause 22.6)

Replace the words "Otherwise" with "In case such work is not in the scope of the Contractor", in the second last line of second paragraph of GC clause 22.6.

PC 23.3 Supplementing sub-clause GC 23.3

For notification of testing, four weeks shall be deemed as reasonable advance notice.

PC 23.7 Test and Inspection (GC Clause 23.7)

Replace the words "GC Sub-Clause 6.1" with "GC Sub-Clause 46.1", in the last line of GC clause 23.7.

ANNEXURE VI

Approved Labour License & Insurance Policy by Contractor

GOVT.OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
OFFICE OF THE DEPUTY CHIEF LABOUR COMMISSIONER (CENTRAL)
KENDRIYA SHRAM SADAN, R.K.MISSION ROAD, BIRUBARI, GUWAHATI.
PIN: - 781016

NO: - GH.46 (277)/2016-L

Dated: - 05-10-2021

To
Techno Electric & Engineering Co Ltd
Chandrapur, House No-2, Bishnu Path, Ghuramora
Chariali, Guwahati-781028

Subject: - Contract Labour (Regulation & Abolition) Act, 1970 and Contract Labour(R&A) Central Rules, 1971:- Issue of Renewal of license No: GH.46 (277)/2016-L dated 31-10-2016

Dear Sir,

Please refer to your application for renewal of license dated 04-10-2021 under above mentioned subject, received in this Office on 05-10-2021.

In this connection, please find enclose herewith the Original license duly renewed up to ***30-10-2022***.

Please acknowledge receipt.

Enclose: - As above.

Yours faithfully,

(S.K.CHAKMA)
Assistant Labour Commissioner (Central)
& Licensing Officer under C.L(R&A) Act, 1970

Assistant Labour Commissioner (C)
& Licensing & Registering Officer under
Contract Labour (R&A) Act 1970

ANNEXURE-I

O/O ★ GOVT. OF INDIA ★ GUWAHATI
The Contract Labour (Regulation & Abolition) Act. 1970
Registering Officer & Licencing Officer
ASSISTANT LABOUR COMMISSIONER(C)

LICENSE NO: GH.46 (277)/2016-L

DATED: 31-10-2016.

RENEWAL

(See Rule 29)

DATE OF RENEWAL	FEE PAID	RENEWED UP TO	SIGNATURE OF LICENSING OFFICER
05-10-2021	₹125.00	**30-10-2022**	Assistant Labour Commissioner (C) & Licensing & Registering Officer under Contract Labour (R&A) Act. 1970

FORM-VI

[(See Rule 25(1)]

Government of India

Ministry of Labour & Employment

Office of the Licencing Officer & Assistant Labour Commissioner(Central)

KENDRIYA SHRAM SADAN,R.K.Mission Road,Guwahati-781016

O/O ASSISTANT LABOUR COMMISSIONER (C) GUWAHATI
The Contract Labour (Regulation& Abolition) Act 1970
Registering Officer & Licencing Officer
GOVT OF INDIA

Licence No. GH.46/277/2016-L Dated: 31.10.2016 Fee paid: Rs.75.00

1) Licence is hereby granted to Techno Electric & Engineering Co.Ltd (Rep.by:- Shri P.P.Gupta,M.D) CHANDRARUP,House No.2 Bishnu Path,Ghuramora Chariali, Guwahati-781028 under section 12(1)of the Contract Labour (Regulation and Abolition)Act,1970 subject to the conditions specified in the Annexure.

2) This licence is for doing the work of *ON-SHORE SERVICES CONTRACT FOR GIS SUBSTATION PACKAGE ASM-SS04 under NER FSI Project-World Bank Funded:Intra-State:Assam vide No.CC-CS/94-NER/GIS-2673/1/G4/NOA-III/5760 dt:6.5.16 in the estt:::::::* The Dy.General Manager,POWERGRID,NER,102,Royal Centre,opp.S.B.Decrah College,Ulubari,Guwahati-781007

3) The licence shall remain in force till *30.10.2017*

(HARI OM GAUTAM)
Assistant Labour Commissioner(Central)
and Licencing Officer under CLR&A)Act,1970
GUWAHATI

Date: 31.10.2016

Assistant Labour Commissioner (C) & Licensing & Registering Officer under Contract Labour (R&A) Act, 1970

(RENEWAL)

(See Rule 29)

Date of Renewal	Fee Paid for renewal	Date of expiry	
17.10.2017 25.09.2018 26.09.2019	Rs.100.00 (ONE HUNDRED) Rs.100.00 Rs.100.00	30.10.2018 30.10.2019 30.10.2020	A.L.C.(C) GUWAHATI

ANNEXURE

Date.

The Licence is subject to the following conditions:-

1) The Licence shall be non transferable.

2) The number of workmen employed as contract labour in the establishment shall not, on any day exceed **100** (One hundred)only

Contd..Page.2

3) Except as provided in the rules the fees paid for the grant, or as the case may be for renewal of the licence shall be non refundable.

4) The rates off wages payable to the workmen by the contract shall not be less than the rates prescribed for the Schedule of employment under the Minimum Wages Act , 1948 , where applicable and where the rates have been fixed by agreement settlement or award,not less than the rates fixed.

5) In case where the workman employed by the contractor perform the same or similar kind of work as the workman directly employed by the Principal Employer of the establishment , the wage rates , holidays , hours of work and other conditions of service of the workman of the contractor shall be the same as applicable to the workmen directly employed by the Principal Employer of the establishment on the same or similar kind of work provided that in the case of any disagreement with regard to the type of work the same shall be decided by the Chief Labour Commissioner(Central) whose decesion shall be final.

6) In other cases the wage rates,holidays, hours of work and conditions of serviceof the workmen of the contractor shall be such as may be specified in this behalf by the Chief Labour Commissioner(Central).

7) In every establishment where twenty or more female workmen are ordinarily employed as contract Labour there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years . One of such rooms would be used as a play room for the children and the other as bedroom for the children . For this purpose the contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the sleeping room . The standard of construction and maintenance of the creches may be specified in this behalf by the Chief Labour Commissioner(Central).

8) The licencee shall notify any change in the number of workmen or the conditions of work to the Licencing Officer.

9) A copy of the licence shall be displayed prominently at the premises where the contract work is being carried on.

10) The licencee shall intimate within 15 days the date commencement / completion of the work to the inspector in form VI-A under Rule 81(3).

(HARI OM GAUTAM)
Assistant Labour Commissioner(Central)
and Licensing Officer under(CLR&A)ACT 1970
GUWAHATI

Assistant Labour Commissioner (C)
& Licensing & Registering Officer under
Contract Labour (R&A) Act. 1970

ANNEXURE VII

Filled Safety Checklist as Sample

Techno Electric And Engineering Co. Ltd.	Format No.
CHECKLIST FOR WORK AT HIGHT	TEECL/HSE/04

Report No.:- 4

Date:- 7/12/17.

Project:- 132/33kV GIS S/S - Assam (Pattan Bazar)

Location of Work:- Guard wall of Transformer

Supervisor/Engineer:- Dipak Dey

Shift:- 8 AM to 5 PM

Sl. No.	Description	Observation Yes/ No	Remarks
1	Walkway/runway provided with hand-rail & mid-rail at appropriate height.	Yes.	
2	Are ladders properly secured at the top and bottom to prevent slipping, sliding or falling?	Yes.	
3	Do side-rails extend one meter above top of landing?	NO.	After checking done.
4	Rungs and cleats not over 0.3 m on centre?	Yes.	
5	Ladders placed at right slope (equal to 75 degree)?	Yes.	
6	Are landings provided with handrails & kneerails etc?	Yes.	Knee rails not provided.
7	Whether ramp is provided with proper slope (Not more than 2 in 3)?	Yes.	
8	Are working platform provided with adquate width, proper handrails & kneerails at appropriate height ?	Yes.	
9	Whether uses of safety helmets, fall arrest system are ensured for all workers?	Yes.	
10	Safety nets (personnel and material) are in use and maintained clean?	NO.	
11	Whether hot work permit obtained and fire blanket provided to arrest spatters?	No	
12	Medical fitness certificate for height work personnel	Yes.	

Safety Officer

Site-In-Charge

Note: This check sheet to be filled up after thorough inspection and to be submitted to the HOD on weekly basis.

	Techno Electric And Engineering Co. Ltd.	Format No.
	CHECKLIST FOR WORK AT HIGHT	TEECL/HSE/04

Report No.:- 3

Date:- 29/11/17.

Project:- 132/33kV GIS S/S - Assam (Paltanbazar)

Location of Work:- Guard Wall of Transformer

Supervisor/Engineer:- Dipak Dey

Shift:- 8 AM to 5 P.M

Sl. No.	Description	Observation Yes/ No	Remarks
1	Walkway/runway provided with hand-rail & mid-rail at appropriate height.	Yes.	
2	Are ladders properly secured at the top and bottom to prevent slipping, sliding or falling?	Yes	
3	Do side-rails extend one meter above top of landing?	NO	
4	Rungs and cleats not over 0.3 m on centre?	Yes.	
5	Ladders placed at right slope (equal to 75 degree)?	Yes.	
6	Are landings provided with handrails & kneerails etc?	Yes.	
7	Whether ramp is provided with proper slope (Not more than 2 in 3)?	Yes.	
8	Are working platform provided with adquate width, proper handrails & kneerails at appropriate height ?	Partially done.	
9	Whether uses of safety helmets, fall arrest system are ensured for all workers?	Yes.	
10	Safety nets (personnel and material) are in use and maintained clean?	N.A.	
11	Whether hot work permit obtained and fire blanket provided to arrest spatters?	N.A.	
12	Medical fitness certificate for height work personnel	~~No~~. Yes.	

for TECHNO ELECTRIC & ENGG CO. PALTANBAZAR SITE

Site In Charge

TECHNO ELECTRIC & ENGG CO. PALTANBAZAR SITE

Safety Officer

Note: This check sheet to be filled up after thorough inspection and to be submitted to the HOD on weekly basis.

Techno Electric And Engineering Co. Ltd.

GENERAL ELECTRICAL SAFETY CHECKLIST

Format No.
TEECL/HSE/06

15/09/2017

Report No.:- 1

SL. NO.	CHECK POINTS	IDEAL CONDITION	OK / NOT OK
1	POWER SOCKETS	No physical Damage	OK
		No loose contacts	OK
		No discoloration by heating	OK
2	CABLES	No bare cable connection	OK
		Welding cable routed properly above the ground	NA
		Joint preparation properly covered by PVC insulation tape	OK
		Cable ends should have suitable rating sockets	OK
		No burning /discoloration/damage insulation	OK
3	CONNECTIONS	Properly socketed and connected	OK
		No overheating of socket cable joints	OK
		No discoloration of insulation by heating	OK
		Proper isolation/insulation of connection points against shock	OK
4	EARTHING	Equipment properly doubly earthed	NA
		Earth connection through proper sockets	NA
		The continuity & tightness of earth conductors are checked?	OK
5	EQUIPMENT	No damage /exposed electrical parts	OK
		Equipment body earthing at two points	NA
		Suitable protection against water/dust	OK
		Live part suitably isolated /insulated	OK
		Rotating parts have suitable guards	OK
		No overloading / overheating of any parts	OK
		No wire fuse, only suitable rated FUSE/NFB	OK
		Suitable plug top provided?	OK
6	ELCB	The connection is routed through ELCB?	OK
		The ELCB numbered & tested periodically & tested results recorded in a logbook counter signed by competent person?	OK
7	DISTRIBUTION BOARDS	Earth conductor continued up to BD/SDB?	OK
		Locking 7 Tagging procedures are used when the equipment is shut down for maintenance?	OK
		Wheather safety warning signs are displayed properly at the workplace (High Voltage)	OK
		DB's & extension boards are protected from rain/water (weather protection)	OK
		Wheather adequate clearance from HT conductor/lines above ground/adjacent building is maintained?	OK
		Correct/proper fuse &CBs provided at main boards & sub boards?	OK

Remarks:- (if Any)

Safety Officer	Site-In-Charge

15.09.2017

Techno Electric And Engineering Co. Ltd.

GENERAL ELECTRICAL SAFETY CHECKLIST

Format No. TEECL/HSE/06

16/10/2017

Report No.:- 2

SL. NO.	CHECK POINTS	IDEAL CONDITION	OK / NOT OK
1	POWER SOCKETS	No physical Damage	OK
		No loose contacts	OK
		No discoloration by heating	OK
2	CABLES	No bare cable connection	OK
		Welding cable routed properly above the ground	NA
		Joint preparation properly covered by PVC insulation tape	OK
		Cable ends should have suitable rating sockets	OK
		No burning /discoloration/damage insulation	OK
3	CONNECTIONS	Properly socketed and connected	OK
		No overheating of socket cable joints	OK
		No discoloration of insulation by heating	OK
		Proper isolation/insulation of connection points against shock	OK
4	EARTHING	Equipment properly doubly earthed	NA
		Earth connection through proper sockets	NA
		The continuity & tightness of earth conductors are checked?	OK
5	EQUIPMENT	No damage /exposed electrical parts	OK
		Equipment body earthing at two points	NA
		Suitable protection against water/dust	OK
		Live part suitably isolated /insulated	OK
		Rotating parts have suitable guards	OK
		No overloading / overheating of any parts	OK
		No wire fuse, only suitable rated FUSE/NFB	OK
		Suitable plug top provided?	OK
6	ELCB	The connection is routed through ELCB?	OK
		The ELCB numbered & tested periodically & tested results recorded in a logbook counter signed by competent person?	OK
7	DISTRIBUTION BOARDS	Earth conductor continued up to BD/SDB?	OK
		Locking 7 Tagging procedures are used when the equipment is shut down for maintenance?	OK
		Wheather safety warning signs are displayed properly at the workplace (High Voltage)	OK
		DB's & extension boards are protected from rain/water (weather protection)	OK
		Wheather adequate clearance from HT conductor/lines above ground/adjacent building is maintained?	OK
		Correct/proper fuse &CBs provided at main boards & sub boards?	OK

Remarks:- (if Any)

Safety Officer

16.10.2017

for

Site In Charge

TECHNO ELECTRIC & ENGG CO. LTD. PANAGARH SITE

TECHNO ELECTRIC & ENGG CO. LTD. PANAGARH SITE

	Techno Electric And Engineering Co. Ltd. EXCAVATION CHECKLIST	Format No. TEECL/HSE/07

Report No:- 1

Project Name: 132/33 kV GIS S/S - Assam

Date:- 29/9/17

Location:- Back Side of Brigedi Bhawan

No.	Item	Yes/No	Remarks
1	Prior to start, whether all existing utilities has been identified & removed / isolated / protected?	Yes.	
2	Whether the sides adequately supported by bracing and shoring for trenches more than 1.5 m depth in loose soil / clay?	Yes.	
3	Did all excavated or other materials store or retain at least 1m or more from the edges of the excavation?	Yes	
4	Barricades have been provided to all excavations?	Yes	
5	Are employees equipped with adequate PPE's i.e. reflective jacket, safety helmet, safety shoes etc.	Yes.	
6	Are excavations inspected by a competent person after every rainstorm or other hazard increasing occurrences.	By Power Grid.	
7	Are there emergency control measures available in case of side collapse?	Yes.	
8	Whether adequate access has been provided to excavated pit i.e. ramp, ladder etc.	Yes.	

Safety Officer

for

Site In-Charge

TECHNO ELECTRIC & ENGG. CO. LTD. PALTANBAZAR SITE

Note: This checklist to be filled up after thorough inspection and to be submitted to the HOD on weekly basis.

	Techno Electric And Engineering Co. Ltd.	Format No.
	EXCAVATION CHECKLIST	TEECL/HSE/07

Project Name: 132/33 KV GIS S/S ASSAM
Location:- BACK SIDE OF BIJULI BHAWAN

Report No.:- 02
Date:- 06/10/17

No.	Item	Yes/No	Remarks
1	Prior to start, whether all existing utilities has been identified & removed / isolated / protected?	YES	
2	Whether the sides adequately supported by bracing and shoring for trenches more than 1.5 m depth in loose soil / clay?	YES	
3	Did all excavated or other materials store or retain at least 1m or more from the edges of the excavation?	YES	
4	Barricades have been provided to all excavations?	YES	
5	Are employees equipped with adequate PPE's i.e. reflective jacket, safety helmet, safety shoes etc.	YES	
6	Are excavations inspected by a competent person after every rainstorm or other hazard increasing occurrences.	By Power Grid	
7	Are there emergency control measures available in case of side collapse?	YES	
8	Whether adequate access has been provided to excavated pit i.e. ramp, ladder etc.	YES	

for

Site In-Charge

Safety Officer

TECHNO ELECTRIC & ENGG. CO. LTD. PALTANBAZAR SITE

Note: This check sheet to be filled up after thorough inspection and to be submitted to the HOD on weekly basis.

ANNEXURE VIII

Notification of Grievance Redressal Committee

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
एन.आर.पी.एस.आई.पी, Guwahati

अंतर कार्यालय ज्ञापन

पावरग्रिड

प्रेषक / From : D G M
(NERPSIP & ESMD) ,Guwahati

सेवा में/To : **All Site In-charge,**
Silapathar, Teok, Amingaon,
Guwahati, Tezpur, Mangaldoi,
Dibrugarh, Chapakhowa,
Sarupathar, Misa.

Copy to: GM, NERPSIP

संदर्भ संख्या / Ref: NERPSIP/GHY/ Grievance/AEGCL/239 dated 12.01.2017

दिनांक / Date : 13.02.2017

विषय/Sub :- Site / Project Level Grievance Redressal Committee (GRC)

Dear Sir,

With reference to the above, this is to inform you that as envisaged in the World Bank's Project Appraisal Document (PAD) on NERPSIP, **Site/project level GRCs** have been constituted for each project site under NERPSIP, Assam comprising of nominated representatives from both POWERGRID and AEGCL.

In this regard, henchforth, you are requested to handle all kinds of grievances received at site through the site level GRC and resolve it in a time bound manner.

You are also requested to co-ordinate with AEGCL for nomination of members for GRC also from local administration/village panchayats/reputed persons from society after obtaining consent from them.

This is for your kind information and necessary actions at your end.

Enclosed: Letter from AEGCL (File No: AEGCL/MD/WB/NERPSIP/TECH-I/2016/56)
Dated 09.02.2017

(J.Bardhan)

ASSAM ELECTRICITY GRID CORPORATION LIMITED
Regd. Office: 1st Floor, Bijulee Bhawan, Paltan Bazar, Guwahati – 781 001
CIN: U40101AS2003SGC007238
Phone: 0361-2739520/Fax: 0361-2739513, Web: aegcl.co.in, E-mail: managing.director@aegcl.co.in

File No. AEGCL/MD/WB/NERPSIP/TECH-I/2016/56 **Date: 6th .02.2017**

To,

All AGMs as per attached list.

Subject: Constitution of Site Level Redressal Committee (GRC) for World Bank Funded North Eastern Region Power System Improvement Project (NERPSIP).

With reference to the above, this is to inform you that as per agreed World Bank's Project Appraisal Document (PAD) on NERPSIP (Copy Enclosed), it is imperative for the state utility to set up a **"Grievance Redressal Mechanism"** as mentioned in the state specific ESPPF for effective handling of all stake holder complaints arising out of the project implementation.

You are hereby designated as a member of the Grievance Redressal Committee (GRC). You will keep records of all grievances received during the execution of the project including contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and final outcome. The GRC should resolve the concerns of project affected persons in a time bound manner without impacting the project implementation.

You are also informed that the Implementing Agency (IA) POWERGRID has also nominated members for the GRC.

The detailed list GRC members is enclosed herewith as Annexure-I: For Sub-station Packages, Annexure-II: For Transmission Line Packages and Annexure-III: For Pile Foundation Packages.

This is for information and necessary action.

Encl: As stated above.

9/2/17

(U. N. Borah)
Chief General Manager [T&T]

Memo No.: AEGCL/MD/WB/NERPSIP/TECH-I/2016/56(a) **Date: 6th .02.2017**

Copy to:

1. The Director (PMU), APDCL, Bijulee Bhawan, Guwahati-01 for information.
2. The DGM, LA T&T Circle/UA T&T Circle/Tezpur T&T Circle/Bongaigaon T&T Circle, AEGCL for information and n/a.

(U. N. Borah)
Chief General Manager [T&T]

ANNEXURE-I

WORLD BANK FUNDED NER POWER SYSTEM IMPROVEMENT PROJECT (NERPSIP)			
NERPSIP_EHV GRID SUB-STATION			
Package-Name	**Package Description**	**Members from AEGCL for Site Level GRC**	**Members from PGCIL for Site Level GRC**
ASM-SS-01	**Substation Package (ASM-SS-01) Excluding Transformers for**		
	i) 132/33KV Silapathar (New) S/S	Assistant General Manager, T&T Division, North Lakhimpur, AEGCL,	P A Kumar, DM, Silapathar
	(ii) 132/33 kV Tezpur (New) S/S	Assistant General Manager, 132/33 KV Depota Grid sub station, AEGCL, Depota	S. K. Dutta, Ch. Manager, Tezpur
	(iii) Extn. of 132/33 kV Dhemaji S/S	Assistant General Manager, T&T, Division, North Lakhimpur, AEGCL,	P A Kumar, DM, Silapathar
	(iv) Extn. of 132/33 kV Sonabali S/s	Assistant General Manager, 132/33 KV Depota Grid sub station, AEGCL, Depota	S. K. Dutta, Ch. Manager, Tezpur
	(v) Augmentation of 220/132KV Samaguri S/S.	Assistant General Manager, 220/132/33 KV Samaguri Grid Sub Station, AEGCL, Samaguri	
ASM-SS-02	**Substation Package (ASM-SS-02) Excluding Transformers for**		
	i) 220/132KV Behiating(New) S/S	Assistant General Manager, 132/33 KV Dibrugarh Grid Sub Station, AEGCL, Dibrugarh	S. F. Shah, Asst. GM, Dibrugarh
	(ii) Extn of 220 kV Tinsukia S/S	Assistant General Manager, 220/132/33 Tinsukia KV Grid Sub Station, AEGCL, Tinsukia	
	(iii) 132/33 kV Chapakhowa (New) S/S	Assistant General Manager, 220/132/33 Tinsukia KV Grid Sub Station, AEGCL, Tinsukia	
	(iv) 132/33 kV Sarupathar (New) S/s	Assistant General Manager, Jorhat T&T Division,AEGCL, Garmur	D. D. Misra, Asst. GM, Sarupathar
	(v) 132/33KV Teok (New) S/S	Assistant General Manager, Jorhat T&T Division,AEGCL, Garmur	S. N. Dey, Ch. Manager, Teok
	(vi) Extn of 132/33KV Rupai S/S.	Assistant General Manager, 220/132/33 Tinsukia KV Grid Sub Station,AEGCL, Tinsukia	S. F. Shah, Asst. GM, Dibrugarh

ANNEXURE-II

WORLD BANK FUNDED NER POWER SYSTEM IMPROVEMENT PROJECT (NERPSIP)

NERPSIP TL Package

Package-Name	Package Description	Members from AEGCL for Site Level GRC	Members from PGCIL for Site Level GRC
	Turnkey Tower Package (TW01) including conductor, insulators, earthwire/OPGW, hardware fitting and accessories for conductor & earth wire for		
TW01	(i) 220 kV D/C Rangia-Amingaon	Assistant General Manager, 132/33 KV Rangia Grid sub station,AEGCL, Chirakhundi	**K. C. Barman, Asst. GM, Guwahati**
TW02	(ii) 220 kV D/C Tinsukia-Behiating	Assistant General Manager, 132/33 KV Dibrugarh EHV SS, AEGCL,Dibrugarh	**S. F. Shah, Asst. GM, Dibrugarh**
	Turnkey Tower Package (TW02) including conductor, insulators, earthwire/OPGW, hardware fitting and accessories for conductor & earth wire for		
TW03	(i) 132 kV D/C Kahilipara-Guwahati Medical College TL	Asst. General Manager, 132/33 KV Kahilipara Grid S/S,ASEB Campus, Guwahati - 781 019	**K. C. Barman, Asst. GM, Guwahati**
	(ii) 132 kV D/C Amingaon-Hazo TL	Asst. General Manager [T & T],ASEB CAMPUS, NARENGI, GUWHATI – 781 026	
	(iii) LILO of 132 kV S/C Rangia-Rowta TL	Assistant General Manager, 132/33 KV Depota Grid sub station, AEGCL, Depota	**S. K. Rava, DM, Mangaldoi**
	(iv) LILO of 132 kV S/C Kamalpur-Sishugram at Amingaon	Asst. General Manager, 132/33 KV Kahilipara Grid S/S,ASEB Campus, Guwahati - 781 019	**K. C. Barman, Asst. GM, Guwahati**
	(v) LILO of 132 kV S/C Kamalpur-Khamakhya at Amingaon	Asst. General Manager, 132/33 KV Kahilipara Grid S/S,ASEB Campus, Guwahati - 781 019	

ANNEXURE-III			
WORLD BANK FUNDED NER POWER SYSTEM IMPROVEMENT PROJECT (NERPSIP)			
NERPSIP Pile Foundation Packages			
Package-Name	**Package Description**	**Members from AEGCL for Site Level GRC**	**Members from PGCIL for Site Level GRC**
P-01	Pile Foundation Package for River Crossing locations corresponding for Tower package 220 KV D/C Rangia-Amingaon TL	Assistant General Manager, 132/33 KV Rangia Grid sub station,AEGCL, Chirakhundi	**K. C. Barman, Asst. GM, Guwahati**
	Pile Foundation Package for River Crossing locations corresponding for Tower package 132 KV S/C(on D/C Tower) Rupai-Chapakhowa TL	Assistant General Manager, 220/132/33 Tinsukia KV Grid Sub Station,AEGCL, Tinsukia	**S. F. Shah, Asst. GM, Dibrugarh**

9/2/17

Chief General Manager [T&T]

O/o The MD, AEGCL, Bijulee Bhawan, Ghy-01