ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT - ENVIRONMENT AND SOCIAL MANAGEMENT PLAN REPORT FOR TRANSMISSION LINES OF PACKAGE - H

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ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

SUBMITTED TO

ASIAN INFRASTRUCTURE INVESTMENT BANK

SUBMITTED BY

ASSAM ELECTRICITY GRID CORPORATION LIMITED

PREPARED BY: PT FEEDBACK INFRA CONSORTIUM

This Environment and Social Impact Assessment (ESIA) - Environment and Social Management Plan (ESMP) report is a document of the borrower and made publicly available in accordance with AIIB's Environmental and Social Framework. The views expressed herein do not necessarily represent those of AIIB's Board of Directors, Management, or staff.

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List of Abbreviations

AEGCL	Assam Electricity Grid Corporation Limited
AGM	Assistant General Manager
AIIB	Asian Infrastructure Investment Bank
AISTSEP	Assam Intra-State Transmission System Enhancement Project
ARAP	Abbreviated Resettlement Action Plan
BOQ	Bill of Quantity
CEA	Central Electricity Authority
CESMP	Contractor's Environmental and Social Management Plan
DC or D/C	Double Circuit
DisCom	Distribution Company
E&S officer	Environment and Social Officer
E&S Policy	Environmental and Social Policy
E&S	Environment and Social
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management and Planning Framework
ESS	Environmental and Social Standard
GIS	Gas Insulated Substation
GoA	Government of Assam
GoI	Government of India
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HTLS	High Temperature Low Sag
IA	Implementing Agency
INR	Indian Rupee
IP	Indigenous Peoples
IPP	Indigenous People Plan
IUCN	International Union for Conservation of Nature
Km	Kilometre
LC	Least Concern
LILO	Loop in Loop out
MoEF&CC	Ministry of Environment, Forest and Climate Change
MVA	Mega Volt Ampere
NGO	Non-Government Organization
OPGW	Optical Power Ground Wire
PAPs	Project Affected Persons
PFA	Power for All
PIU	Project Implementation Unit
PMC	Project Management Consultancy
PMU	Project Management Unit
RoW	Right of Way

S/S	Substation (s)
SC or S/C	Single Circuit
STU	State Transmission Utility
T&T	Tower and Transmission
TL	Transmission Line
VU	Vulnerable

WEIGHTS AND MEASURES

Ha. (Hectare)	10,000 sq. m = 2.47105 Acre
Km (kilometer)	1,000 meters
kV	kilovolt (1,000 volts)

EXECUTIVE SUMMARY

Background: The Asian Infrastructure Investment Bank (AIIB), through Government of India (GOI), has been approached by Government of Assam (GoA) for financial and technical assistance to upgrade and strengthen Assam's power transmission network under the Power for All (PFA) initiative. To enhance power supply reliability, AIIB has extended their support for the "Assam Intra-State Transmission System Enhancement Project" (AISTSEP) implemented by Assam Electricity Grid Corporation Limited (AEGCL).

The Project under Phase I includes the construction of 10 new substations in 400kV, 220kV and 132kV voltage level along with the associated (332.945 km) transmission lines (TL), Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS; Augmentation of 18 existing substations (replacement of old transformers with new transformers); Augmentation of 186 km of transmission line (restringing of One Single Circuit (S/C) line and two Double Circuit (D/C) line) by High Temperature Low Sag (HTLS) conductors; Replacement of ground wire to Optical Power Ground Wire (OPGW) for 636 km of existing transmission lines and substation equipment's at substations.

As part of AIIB's E&S policy and its compliance requirements as stipulated in the agreed environmental and social management planning framework (ESMPF) for the project, an Environmental and Social Impact Assessment including an Environmental and Social Management Plan (ESIA - ESMP) is to be in place for transmission lines before commencement of the work.

PT Feedback Infra Limited (PTFIL), Indonesia in Association with Jade Consult Nepal and NIPSA, Spain has been engaged by AEGCL as Project Management Consultant (PMC) including scope of preparation of ESIA–ESMP report for the transmission lines.

Description of the Project: The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP) is pertaining to the Transmission Line namely:

A. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line – 19.500 km

Further, a separate ESIA/ESMP will be prepared for other Transmission Line under Package-H, as the tower design and engineering documents are currently under review and yet to be approved. Subsequently after approval, check survey will be initiated. After completion of check survey, the EPC Contractor will submit the report to AEGCL for approval. Accordingly, based on the final approved check survey report an ESIA-ESMP report will also be prepared for the following line:

- 220KV D/C LILO at Sonapur GIS from 220KV Langpi-Sarusajai line – 2.600 km

For the LILO of the 400 kV S/C Silchar–Byrnihat transmission line, out of the total 68 tower foundation locations, temporary access roads will be required for 29 tower foundation locations, which includes 13 towers on forest land and one tower on tea estate land. The remaining 39 tower foundation locations are accessible through existing rural roads, forest tracks/cart roads, and tea estate roads. Most of the tower foundation sites are situated in paddy fields, forest areas, and one on tea estate land. In total, approximately 1.29 hectares of land will be temporarily impacted due to the construction of access roads, primarily

affecting paddy crops. However, no new access roads are to be constructed inside the West Aprikola Reserved Forest.

Key pre-construction & construction phase activities are reconnaissance, walkover, detailed route survey to finalize route alignment & tower spotting, soil investigation to ascertain tower foundation design. Other activities included RoW marking, site clearing, foundation works, tower erection, stringing, tower footing protection (if required) final checking & testing & commissioning. The estimated timeframe for the overall construction of the transmission line is eleven working months, i.e. from January 2026 to April 2026 and October 2026 to April 2027.

A brief of activities undertaken during Operation phase are ground inspection by lineman/team, inspection of towers, thermo-vision scanning, punctured insulator detection & attending all defects. An estimated 60 (3 gangs with 20 persons in each gang) number of labour will be engaged by the contractor during construction period.

The above-mentioned Transmission Line corridor is located in the Kamrup (Metro) district in the State of Assam.

The Right of Way required for the transmission line is **46 m** (23 m on each side of the transmission line route) which is approx. **89.70 hectare** in total. The tower base area required varies from 246 to 356 sq. m (DA type towers), 304 to 465 sq. m (DB type towers) 365 to 556 sq. m (DC type towers) and 439 to 886 sq. m (DD type towers).

The RoW permission for the transmission line has been obtained in keeping with the requirements of the Electricity Act 2003, the Indian Telegraph Act 1885, MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 and Assam Government Power (Electricity) Department, Dispur, Guwahati-6 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) MoP new guideline March 2025 & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

Cost of the project is as under:

A. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line – 19.500 km
Supply Portion – Rs. 979,846,692.50 with GST.
Erection Portion – Rs. 142,953,414.60 with GST.

Policy, Legal and Administrative Framework: As per the EIA Notification, 2006 (and its amendments), power transmission projects including substations and lines do not require environmental clearance from MoEF&CC, Govt. of India. However, project linked activities like quarrying (if any) may need clearance. Forest clearance is applicable if the project involves forest land. Wildlife clearance from State/National Board of Wildlife is required; if it falls within notified wildlife or eco-sensitive zones and wetland clearance is required for projects in notified wetlands. However, for 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line only forest clearance is required due to involvement of **14.28 Ha of forest land** in West Aprikola Reserved Forest, Assam. The detail of the various regulatory frameworks pertaining to the project has been discussed in the main ESIA-ESMP report.

As the Project is funded through the AIIB, the Bank's Environmental and Social Policy (ESP) applies. The Project has been assigned to "Category B" as per the ESP, as the Transmission lines are not located in ecological sensitive areas.

Environmental and Social Standards (ESS 1) Environmental and Social Assessment and Management are applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

Environmental and Social Standards (ESS 2) Involuntary Resettlement is applicable and accordingly Abbreviated Resettlement Action Plan/Resettlement Action Plan (ARAP/RAP) has been prepared. Once finalized it will be disclosed prior to the commencement of works.

Environmental and Social Standards (ESS 3)) Indigenous Peoples- A total of seventy-eight (78) households belonging to the Scheduled Tribe (Plains) community are currently identified as affected by the Project. Additional ST households may be identified following the completion of the census survey within the RoW. The nature of impacts on these households is assessed as minor, temporary, and primarily economic, consisting mainly of crop loss and temporary restrictions on land use within the RoW. Although the Project area does not fall within a Sixth Schedule area under the Constitution of India, the presence of Boro (Bodo), Garo, and Karbi ST households is noted. These groups are recognized as distinct Indigenous communities, possessing their own languages, cultural traditions (including festivals such as Bwisagu), and customary social institutions (e.g., traditional village councils). Accordingly, they meet the defining characteristics of Indigenous Peoples as set out under AIIB Environmental and Social Framework (ESF) 2024 – ESS 3.

Accordingly, project impacts affecting IP/ST households will be addressed through inclusive environmental and social assessment, meaningful consultation, mitigation, and monitoring measures consistent with AIIB requirements. While a separate Indigenous Peoples Plan (IPP) may not require, impacts on Scheduled Tribe households will be adequately managed under ESS 1 – Environmental and Social Assessment and Management and ESS 2 – Involuntary Resettlement, where land acquisition, livelihood impacts, or access restrictions occur. Compensation and assistance measures will be implemented in accordance with applicable national regulations and ESS 2 requirements, with particular attention to ensuring that Scheduled Tribe households are not disadvantaged in accessing project entitlements, grievance redress mechanisms, or livelihood restoration support.'

Description of the Environment: The project site i.e. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Transmission Line is located in the Tehsil Sonapur under Kamrup (Metro) district of Assam. The project footprint (RoW) is spread across 10 villages for the 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Transmission Line.

The direct impacts of the project are confined to the Right of Way (RoW) of the transmission line and indirect or induced impacts extends to the Area of Influence (AoI) defined by a buffer zone of 2 Km on either side of the transmission line. A 10 Km radius is also considered for evaluating the impact on flora & fauna of the project area.

The environmental and social attributes were assessed through both primary and secondary studies. Primary attributes including air environment, water, soil, noise, flora and fauna, and public consultation were evaluated through field studies, on-site monitoring and review of the past studies. Secondary

attributes such as land use patterns, geology, physiological characteristics, and socio-economic profile were analyzed through literature review of previous studies conducted by various government Agencies & research publications. An interdisciplinary team through discussions and professional judgment formulated the scoping and the extent of data generation.

In the project area the land is primarily used for agriculture i.e. Paddy (rice) which is a seasonal crop/ crops (vegetables) and Tea garden. The other land uses in the area are built up residential areas and water bodies.

No protected areas (National Park, Wildlife Sanctuaries and Biosphere Reserves), notified historical and cultural sites etc. are falling in the Right of Way (RoW) of the proposed transmission line. However, a portion of the West Aprikola Reserved Forest falls within the Right of Way (RoW) of the proposed transmission line. Accordingly, the *In-Principle Approval (Stage-I Forest Clearance)* of the Central Government has been granted for the diversion of **14.28 hectares** of forest land for the construction of the 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Transmisson Line within the West Aprikola Reserved Forest under **Kamrup East Division, Basistha**, in favour of **AEGCL**.

Based on the observation at site it has been perceived that the ambient air quality of the project area is good. The ambient air quality monitoring conducted at Sonapur S/S shows that the value of PM_{10} and $PM_{2.5}$ are 64 & 27 µg/m^3 respectively.

Based on the observation at site it has been perceived that the project area has minimal surface & ground water and soil contamination. Therefore, requirement of conducting test for water and soil quality monitoring is not critical.

As per the detailed survey report, the Right of Way of " 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line " involves the felling of approximately 546 trees within forest areas, for which the necessary permissions have been obtained, and about 6,566 trees, comprising both fruit-bearing and non-fruit-bearing species, outside the forest area. In addition, approximately 4,938 bamboo plants are present within the RoW corridor. For trees involving in forest area (14.28 Ha) the required amounts towards Net Present Value (NPV), Cost of Compensatory Afforestation, and Overhead Charges, have been deposited through the online portal into the CAMPA account, amounting to **₹5,34,75,093.00.**

No negative impact from the project is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs) or archaeological/historical sites as assessed during the detailed and check survey.

There are no Protected Cultural Resources (PCRs), Common Property Resources (CPRs), or archaeological/historical sites located within the Right of Way (RoW) corridor of the proposed 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat transmission line. However, beyond the Right of Way of the proposed line, the following CPRs have been identified: 9 places of worship, 9 Schools, 2 Public health centers, 1 community hall, 1 Forest office, 1 Cemetery, 1 Panchayat office and 1 Library.

During the construction phase, no impact is anticipated on the above mentioned CPRs, as most of them are located at a considerable distance from the center line of the transmission lines.

Impact Assessment: Environmental sensitive sites including the Key Biodiversity Areas (KBA), Important Bird and Biodiversity (IBA) sites are not involved in the corridor (RoW) of the transmission line. Permanent

restricted use of land is required for the tower footing area. However, no land is acquired permanently for the tower foundations or Right-of-Way (RoW), and ownership of the land will remain with the respective landowners. Agricultural activities will be allowed to continue within the RoW after construction; however, for the tower base area, it is recommended that agricultural activities not be carried out due to electrical safety considerations. Moreover, compensation of land utilised for tower footing and RoW will be paid as per Ministry of Power, Government of India (MoP, GoI) guidelines and *Zirat*[1] Value (tree and crop damages) will be paid to the individual landowners as per compensation guidelines/procedures. As assessed from the site visit and observation, no major environmental and social issues have been recorded and the impacts are manageable with proper mitigation measures. Details of impact assessment and mitigation measures are discussed in the main report.

Climate Risk and Adaptation at the Design Stage: Remedial measures for climate risks have been adapted for Transmission Line at the design stage.

Stakeholder & Public Consultation and Information Disclosure: The community consultations were carried out in all the villages along the transmission line corridor with local habitants where sixty-five (65) participants were participated in the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS substation. These participants included poor or economically marginalized communities, women, vulnerable groups and other local community leaders nearby the proposed transmission lines and detailed dates to include in the main text.

Summary of Key consultation findings:

- The local community was informed in detail about the project scope, including the construction of the proposed transmission lines to the Sonapur substation.
- The procedures for payment of compensation for land, trees, and crops were explained to the landowners.
- Potential impacts associated with the transmission lines were discussed, along with measures to minimize these impacts.
- Landowners were briefed on the specific documents required for disbursement of compensation related to tower footing, RoW, and *zirat* (assets) compensation.
- It was clarified that common property resources will be fully avoided during construction of tower footing. If any utilities are identified, alignment will be adjusted to prevent impacts.
- The community was informed about the establishment of a Grievance Redressal Committee, and that they can approach this committee directly in case of any grievances arising during project implementation.

This draft ESIA - ESMP will be disclosed online on the website of AIIB and AEGCL. The hardcopies of the same (English version) and Assamese version of the Executive Summary will be available at the following locations:

1. PMU: Project Director,
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520

[1] Zirat" refers to the trees, crops, and other improvements existing on a piece of land, apart from the land itself.

Website: www.aegcl.coc.in

2. PIU: Project Manager
Address: AGM, 132 kV Kahilipara GSS, AEGCL
Email: agm.kahilipara@aegcl.co.in

Grievance Redress Mechanism (GRM): To ensure environmentally and socially responsible implementation a free, multi-tiered Grievance Redress Mechanism (GRM) will be established to promptly address concerns or complaints from project-affected people or workers, helping to resolve issues efficiently and avoid litigation. The GRM will consist of two levels of committees:

• Tier I – Operates at the field level.
• Tier II – Functions at the Project Management Unit (PMU) / Headquarters level. Tier II: The composition of the Tier II and Tier II GRCs is available in Chapter 9.
The contact detail of AEGCL: -

1 DGM Guwahati
Address Guwahati T &T Circle, AEGCL
Email - dgmttc.guwahati@aegcl.co.in
Contact detail- 94351-99056
2. Resident Engineer
Address: 220/132/33 kV Sonapur GIS, AEGCL
Email: re.sonapur@aegcl.co.in
Contact detail: 9854738617

2. Contact details of EPC Contractor: -

Sl. No.	Name	Designation	Contact Details
1	Surajit Ghosh	EHS Officer	8972149166
2	Parthajit Baishya	Community Consultation Officer	9699945532

The Project-affected People's Mechanism (PPM) has been established by AIIB to provide an opportunity for the independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by the AIIB's failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the AIIB's management processes. Information about the PPM is available at: https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html

Environmental and Social Management Plan: ESMP for identified impacts and the administrative aspects to ensure that mitigation measures are implemented at Site and their effectiveness monitored regularly through Environmental and Social Monitoring program has been detailed in the main report.

The ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor's good Engineering practice an amount of **INR 546.85093 Lakhs** is estimated for implementation of ESMP.

Arrangement for Monitoring and Reporting of Assam Intra-State Transmission System Enhancement Project (AISTSEP) including Reporting Line (from contractor to AIIB) is in place and detailed in the main report.

Capacity building programmes are being conducted by PMC as per the requirement and PMC contract provision. Apart from these, training and capacity building programme are being conducted by E&S team of AIIB to ensure implementation of E&S requirement.

Summary, Recommendations and Conclusion: The ESMP provides a structured approach to ensure that the temporary impacts during construction are minimized, while also maximizing the positive benefits such as local employment opportunities, through effective management and monitoring.

It is recommended to implement all the mitigation measures outlined in Environmental and Social Management Plan, monitor Environmental and Social Monitoring Plan, continuous public consultation and maintaining GRM.

In conclusion, it can be stated that the proposed project will yield positive result in terms of reliable & enhanced power supply and generating local employment opportunities. The environment & social impacts identified in the ESIA study are manageable and can be mitigated effectively through compensation, adoption of preventive measures and careful planning during the construction & operational phase.

1 Introduction

1.1 Background

Asian Infrastructure Investment Bank (AIIB) extends financial assistance for "Assam Intra-State Transmission System Enhancement Project" (AISTSEP) to Assam Electricity Grid Corporation Limited (AEGCL), the Implementing Agency (IA), to support the implementation of Power for All (PFA) plan. The Project under Phase I includes the construction of 10 new substation in 400kV, 220kV and 132kV voltage level along with the associated (332.945 km) transmission lines (TL), Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS; Augmentation of 18 existing substations (replacement of old transformers with new transformers); Augmentation of 186 km of transmission line (restringing of One Single Circuit (S/C) line and two Double Circuit (D/C) line) by High Temperature Low Sag (HTLS) conductors; Replacement of ground wire to Optical Power Ground Wire (OPGW) for 636 km of transmission lines and substation equipment's at substations.

As part of AIIB's Environmental and Social Policy (ESP) and its compliance requirements, an Environmental and Social Impact Assessment - Environmental and Social Management Plan (ESIA - ESMP) is to be in place for transmission lines.

PT Feedback Infra Limited (PTFIL), Indonesia in Association with Jade Consult Nepal and NIPSA, Spain has been engaged by AEGCL as Project Management Consultant (PMC) including scope of preparation of ESIA – ESMP report for the transmission lines. The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA - ESMP) report focuses on the constructions of one transmission line namely

A. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line – 19.500 km

1.2 Purpose of the report

Power transmission projects are not listed in the list of environmentally sensitive projects as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt of India and hence no Environmental Clearance (EC) is required to be obtained as per National law. However, project associated activities like quarry operation/borrowed earth etc. (if any) may require prior Environmental Clearance.

As per AIIB's ESP, an ESIA – ESMP shall be prepared to assess E&S risks and impacts and design appropriate mitigation measures associated with the subproject's activities.

The present ESIA – ESMP report discusses the project description, policy, legal and institutional framework, current (baseline) environmental and social status, analysis of alternatives, assessment for potential environmental and social impacts and mitigation measures, climate risk and adaptation at the design stage, environmental and social management plan, stakeholder consultations and public disclosure, recommendations and conclusion.

1.3 Objective and scope of ESIA

The objective of this report is to carry out Environment and Social Impact Assessment (ESIA) for the proposed activities in line with approved Environment and Social Management Planning Framework (ESMPF) of the project.

The scope includes the following:

- Review and update (if any) policy, legal and institutional framework as detailed in approved ESMPF,
- Current (baseline) environmental and social status (Description of the environment baseline of the project in terms of the key sensitivities and potential constraints on the construction and operation and maintenance of the transmission line),
- Analysis of alternatives (assessment of alternatives available for the project),
- Assessment for potential environmental and social impacts and mitigation measures,
- Climate risk and adaptation at the design stage,
- Stakeholder consultations and public disclosure,
- Grievance Redress Mechanism (GRM),
- Environmental and Social Management Plan (ESMP),
- Recommendations

1.4 Approach and key tasks for this ESIA study

The following approach has been considered for preparation of present ESIA – ESMP report.

Screening: Assessment of the requirements of relevant International, National, State Act/Policies and also AIIB's E&S policy. Environmental Clearance is not required as per the EIA Notification of MoEF&CC. Screening determines whether the project requires a full EIA based on its scale, location, and potential impacts. The project has been categorized as **'Category B'** as per AIIB's E&S policy with limited, site-specific and reversible impacts and that requires an ESIA – ESMP for transmission lines to be prepared.

Scoping: Scoping identifies the key environmental issues to be studied in detail, such as impacts on forests, wildlife, communities, and electromagnetic fields. Reconnaissance survey within the project footprint (i.e., RoW), 2 km and 10 km (for biodiversity assessment) buffer from either side of transmission line to assess environmental and social sensitivity has been done for the project. Together, they help streamline the assessment process, ensuring focus on significant environmental concerns and facilitating informed decision-making.

Baseline data collection: It includes details about physical environmental resources and social & economic aspects along the project footprint, 2 km; and 10 km (for biodiversity assessment) from either side of transmission lines.

Baseline data collection has been initiated in the month of September, 2025 from secondary sources. Site reconnaissance survey has been conducted in October, November and December, 2025 by comprising team of Environmental & Social Experts of PMU & PMC along with Environmental & Social Investigation officers of PMC.

Public and stakeholder consultations: The public consultation has been conducted with the local community residing near the proposed transmission lines in the month of September, October, November and December 2025.

Impact Assessment: Impact Assessment has been done (identification, prediction and evaluation) based on the available data from primary & secondary sources, site assessment and public consultation.

ESMP: Development of practical mitigation measures and management, monitoring plan, budget and institutional framework has been done in line with the approved ESMPF.

1.5 Limitations

The basis of this ESIA-ESMP report is scientific principles and professional judgement of experts based on available secondary data and data gathered during primary survey for impact assessment, mitigation measures as per the requirement and provide management plan. There are some limitations in preparation of this ESIA-ESMP report assessed as follows:

- ESIA-ESMP is prepared with available information as per approved check survey observations made during site survey and consultation at site.
- The consultations were undertaken, as part of the ESIA, with the local community, who were available for consultations at the time of the site visit
- ESS 2 is applicable as there is involuntary permanent and temporary restrictions on land use for the tower footing as well as RoW of the Transmission line. Accordingly, a Resettlement Action Plan (RAP) has also been prepared.

ESS 3 - A total of seventy-eight (78) households belonging to the Scheduled Tribe (Plains) community are currently identified as affected by the Project. Additional ST households may be identified following the completion of the census survey within the RoW. The nature of impacts on these households is assessed as minor, temporary, and primarily economic, consisting mainly of crop loss and temporary restrictions on land use within the RoW. Although the Project area does not fall within a Sixth Schedule area under the Constitution of India, the presence of Boro (Bodo), Garo, and Karbi ST households is noted. These groups are recognized as distinct Indigenous communities, possessing their own languages, cultural traditions (including festivals such as Bwisagu), and customary social institutions (e.g., traditional village councils). Accordingly, they meet the defining characteristics of Indigenous Peoples as set out under AIIB Environmental and Social Framework (ESF) 2024 – ESS 3.
Accordingly, project impacts affecting IP/ST households will be addressed through inclusive environmental and social assessment, meaningful consultation, mitigation, and monitoring measures consistent with AIIB requirements. While a separate Indigenous Peoples Plan (IPP) may not require, impacts on Scheduled Tribe households will be adequately managed under ESS 1 – Environmental and Social Assessment and Management and ESS 2 – Involuntary Resettlement, where land acquisition, livelihood impacts, or access restrictions occur. Compensation and assistance measures will be implemented in accordance with applicable national regulations and ESS 2 requirements, with particular attention to ensuring that Scheduled Tribe households are not disadvantaged in accessing project entitlements, grievance redress mechanisms, or livelihood restoration support.'

In case of the 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line, screening was conducted to determine the presence of Indigenous Peoples in accordance with the four defining characteristics outlined under AIIB ESS 3.

The screening findings, verified through field observations and meaningful public consultations with the tribal households (Refer **Appendix 15 -** Photographs and attendance sheet of public consultation with Tribal

households) indicate that although these individuals belong to the Scheduled Tribe (ST) Plains community and are affected by the proposed transmission line, they do not exhibit the substantive socio-cultural characteristics typically associated with Indigenous Peoples as per **ESS 3**. Specifically:

1. **Self-identification and recognition by others:**
   The affected individuals identify as members of the ST Plains community but are socially and culturally integrated with the mainstream population. They are not recognized by others as a distinct indigenous group.
2. **Collective attachment to ancestral territories or natural resources:**
   The affected individuals do not demonstrate collective attachment to any geographically distinct habitat, ancestral territory, or specific natural resources within the project area.
3. **Distinct customary institutions:**
   The affected households follow the same administrative, social, and political systems as the dominant local society, with no separate customary institutions governing their affairs.
4. **Distinct language:**
   The affected individuals communicate primarily in Assamese and do not possess a distinct indigenous language different from the official or regional language.

Moreover, the project area does not fall within a Sixth Schedule area as defined under the Constitution of India.

The affected Scheduled Tribe households are recognized as a vulnerable group under ESS 1. Accordingly, project impacts affecting these households will be addressed through inclusive environmental and social assessment, meaningful consultation, mitigation, and monitoring measures consistent with AIIB requirements. While a separate Indigenous Peoples Plan (IPP) may not require, impacts on Scheduled Tribe households will be adequately managed under ESS 1 – Environmental and Social Assessment and Management and ESS 2 – Involuntary Resettlement, where land acquisition, livelihood impacts, or access restrictions occur. Compensation and assistance measures will be implemented in accordance with applicable national regulations and ESS 2 requirements, with particular attention to ensuring that Scheduled Tribe households are not disadvantaged in accessing project entitlements, grievance redress mechanisms, or livelihood restoration support.'.

1.6 Report structure

Chapter No.	Chapter Name	Contents
Executive summary		This chapter includes a brief summary of the ESIA- ESMP report.
Chapter 1	Introduction	This chapter includes background of the project, purpose of the report, objective and scope of ESIA, approach and key tasks for this ESIA study, limitations and structure of ESIA-ESMP report.
Chapter 2	Project Description	This chapter covers profile of the project route, overview of project site, overview of activities during different phases of the project, land requirement and allotment process.
Chapter 3	Policy, legal and institutional	This chapter describes the applicable national, state level and AIIB's environmental and social laws and regulations and institutional

Chapter No.	Chapter Name	Contents
	framework	framework and International treaties and conventions on environment and labours.
Chapter 4	Description of the Environment	This chapter describes the Baseline Environmental features in detail. It includes details about location characteristics, study area, physical environment, biological environment (flora and fauna) and social environment baseline of the study area.
Chapter 5	Analysis of Alternatives	This chapter elucidates detailed analysis about different options of alignment with considering design, environmental, social and economic aspects. The selection of final alignment with their justification is reflected in this chapter.
Chapter 6	Assessment for Potential Environmental and Social Impacts and Mitigation Measures	This chapter details the impact assessment methodology, anticipated project impacts on physical, biological environment (biodiversity assessment, critical habitat assessment using tools like KBA, IBA, AVISTEP etc.) and social environment, based on baseline environmental features of the project during design, construction and operation phases and mitigation measures for all identified adverse impacts.
Chapter 7	Climate risk and adaptation at the design stage	This chapter describes climate risk and adaptation taken at the design stage.
Chapter 8	Stakeholder consultations and public disclosure	This chapter elaborates stakeholder identification, stakeholder mapping and analysis, stakeholder consultations undertaken as part of the ESIA process in order to assess the impact on project and them and their participation in the project as a continuous process.
Chapter 9	Grievance redress mechanism	This chapter shall highlight the mechanism to redress grievances arises during implementation of the project.
Chapter 10	Environmental and Social Management Plan (EMP) with specific potential E&S impacts	This chapter outlined the ESMP for identified impacts and the administrative aspects of ensuring that mitigation measures are implemented and their effectiveness monitored. This chapter also outlined: ● Environmental and Social Monitoring program for the project. ● Budgetary allocation for implementation of different activities of the ESIA. ● Institutional arrangements for the project, monitoring and reporting indicators for performance of ESMP.
Chapter 11	Summary, recommendations and conclusion	This chapter summarizes the project with impact, mitigation and management plan of the project activities with recommendations and conclusion.
Appendices		Appendices of the project related documents shall be detailed at the end of the report.

2 PROJECT DESCRIPTION

2.1 Overview of Project Site

AEGCL, the State Transmission Utility (STU) of Assam, proposes to implement the "Assam Intra-State Transmission System Enhancement Project" in alignment with the Government of India's "Power for All" (PFA) initiative. The project aims to facilitate the evacuation of power from both state based generating stations and central sector utilities, as well as other sources. Additionally, it seeks to reinforce the state's grid infrastructure and minimize transmission losses. AEGCL is responsible for transmission of electricity to the Distribution Company (DisCom) i.e. APDCL of Assam. The project scope involves construction of substations and associated transmission lines, augmentation, upgradation and installation of equipment of substations. The sub-projects are located in different areas of Assam.

This Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP) is pertaining to the Transmission Line namely:

A. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line – 19.500 km

The Right of Way (RoW) required for the transmission line is 46 m (23 m on each side of the transmission line route) which is approx. **89.70 hectare** in total. The tower base area required varies from 246 to 356 sq. m (DA type towers), 304 to 465 sq. m (DB type towers), 365 to 556 sq. m (DC type towers) and 439 to 886 sq. m (DD type towers).

For the LILO of the 400 kV S/C Silchar–Byrnihat transmission line, temporary access roads will be required for 29 tower foundation locations out of the total 68 tower locations, including 13 towers on forest land and one tower on tea estate land. The remaining 39 locations are accessible through existing rural roads, forest tracks/cart roads, and tea estate roads. Most of the tower foundation sites are situated in paddy fields, forest areas, and tea estate land. In total, approximately **1.29 hectares** of land will be temporarily impacted due to the construction of access roads, primarily affecting paddy crops.

The above-mentioned transmission line corridor i.e. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line is located in the Tehsil Sonapur in Kamrup (Metro) district in the State of Assam. A brief description of the transmission line corridor is given in table 2.1 below followed by a map showing the transmission line (Figure 2.1).

Table 2.1: Brief Description of Different District/Towns/Village crossing the Transmission Line

Sl. No.	Particulars	Different District/ towns/Village crossing the TL
		400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
1	District Name / State	Kamrup (Metro) / Assam
2	Tehsil (Administrative subdivision)	Sonapur
3	Project affected Village	Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar.



Figure 2.1: Map showing 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat transmission line

Table 2.2: Brief Description of Transmission Line corridor

Sl. No.	Particulars	Description
		400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
1	Location Coordinates (start and end)	Starting point of T/L:- 91°52'26.95"E 26°2'57.04"N Ending point of T/L:- 91°59'53.82"E 26°7'57.07"N
2	Project affected Village	Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar.
3	Tehsil	Sonapur
4	District Name / State	Kamrup (Metro) / Assam
5	Capacity of Transmission line	400 kV
6	Power Evacuation	The transmission line will evacuate power from existing 400 kV Silchar – Byrnihat transmission line.
7	Climatic zone	Subtropical Humid
8	Elevation	Kamrup (Metro) district – 41 to 150 meters
9	Site Conditions	Some portion of forest land (14.28 hectares), flat agricultural land, crop plantation and water bodies are prominent in the RoW of transmission line.
10	Road Accessibility	Site could be accessed through NH-27 and SH-3B which connects to village roads of the project area.
11	Road crossing	• **National Highway: 1 location** • **State Highway: Nil** • **Village Roads/ cart track: 18 locations**
12	Nearest Airport	Nearest Airport is Lokpriya Gopinath Bordoloi International Airport.

Sl. No.	Particulars	Description
		400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
		Approx. distance is 56.7 Km.
13	Nearest Railway Station	Nearest Railway station is Tetelia. Approx. distance is 5 Km.
14	Railway crossing	2 locations (AP-1A to AP-2 and AP-47 to AP-48).
15	River/canal/small stream/ pond crossing	• **River: Nil** • **Canal: 4 locations** • **Small stream: 2 locations** • **Pond/ Water body: 14 locations**
16	Number of Powerline (66 kV and above) crossing	5 locations (AP-1A to AP-2, AP-39 to AP-40, AP-56 to AP-57, AP-59 to AP-59/1 and AP-59/1 to AP-60).
17	Reserved Forest / Protected areas (WLS/NP/TR etc.)	13 locations (AP- 3 to AP-8, AP- 14 to AP- 16 and AP- 25 to AP- 28)
18	Land Requirement	• **Transmission Corridor (89.70 ha considering 46 m RoW width and 19500 m length of Transmission Corridor)** • **Tower Base Area: DA type towers 246 to 356 sqm, DB type towers 304 to 465 sqm, DC type towers 365 to 556 sqm and DD type towers 439 to 886 sqm.** • **The tower base area for 68 numbers of towers will require an area of 3.66 ha of land.**
19	Land Availability	Obtained RoW permission from District Administration and concern Forest Department.
20	Access Road	The project shall primarily use the existing roads in the area. In addition to this, temporary access routes shall be built during the transmission line construction phase.Further, no new access roads will be constructed inside the West Aprikola Reserved Forest as per requirement of the Forest In Principle Approval.
21	Water Requirement: Construction Phase	The transmission line generally requires about 50 m^3 of water for casting of foundations for each tower, which shall be sourced from local sources through tankers.
22	DG sets	DG Set (5 kVA)
23	Soil Characteristics	Kamrup (Metro) district- Alluvial soil is mostly loamy and consists of a mixture of clay and sand in varying proportions, ranging from pure sand on the banks of the Brahmaputra to sticky clay content depending on location.
24	Seismic Zone	Seismic Zone V – Earthquake Hazard Zone.
25	Highest Flood Level	Kamrup (Metro) district- 51.46 m
26	Wind zone	The Project area falls in a Very high damage risk zone B (V_b = 50 m/s).

Source: Check Survey report and site visit

Survey of India Toposheet showing transmission line, Environmental and Social Features within 2 KM buffer are given Figure 2.2 below**.** Moreover, IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard is given in table 2.3 below

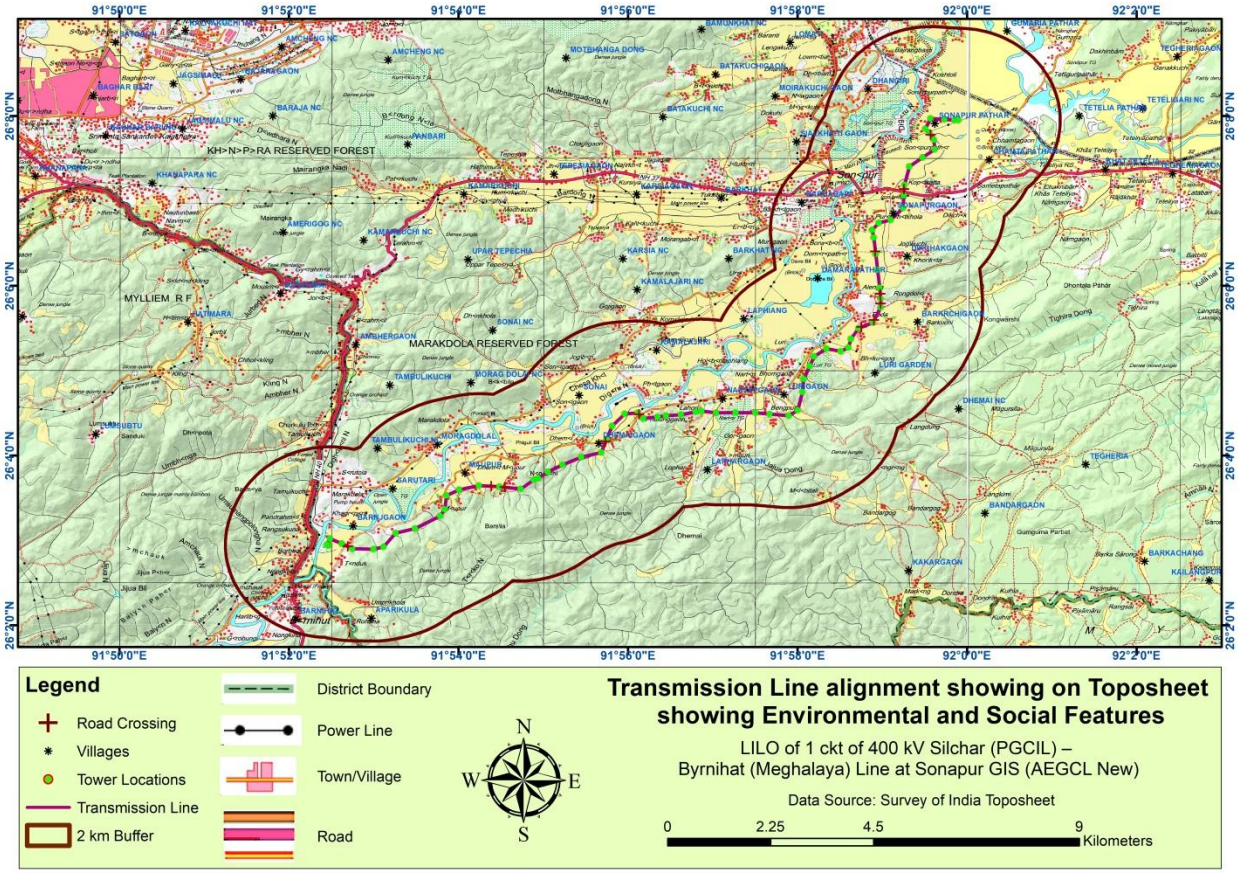


Figure 2.2: Survey of India Topo-sheet showing Sonapur S/s transmission line, Environmental and Social Features within 2 kM buffer area.

Table 2.3: IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard

Sl. No.	Transmission line voltage (In KV)	Maximum RoW (in meter) as per MoEF&CC	Maximum RoW (in meter) as per Electrical standard (in meter)	Minimum clearance between conductor and trees (in meter)	Minimum ground clearance as per Electrical standard (in meter)	Spacing between the lines/cables (in meter)
1.	132	27.00	27.00	4.0	6.10	3.05
2.	220	35.00	35.00	4.6	7.00	4.58
3.	**400 SC/DC**	**46.00/52.00**	**46.00 52 – SC Horizontal configuration**	**5.5**	**8.84**	**5.49**

Source: IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard

Technical details along with layout, design, and other parameters of the towers (different type) and conductors etc. are given in **Appendix -1, Appendix 2A and 2B.**
Detailed methodology for installation of towers and stringing of conductors given in **Appendix 3A & 3B.**

Details of other project resources requirements including construction/workers camps, material supply and storage, access roads etc. are as follows:

Resources

- No of Foundation and Stringing Gangs engaged: 3 nos.
- No of workers per gang: 20 nos.

Worker camps - Worker camps are set in high ground finding a suitable spot which has suitable access road and near to the line. Two labour camps will be established within the substation premises to accommodate workers. Additional camps will be set up at required locations along the transmission line alignment, the locations for which are yet to be identified.. Approximately 60 workers are expected to be deployed along the 19.500 km stretch of the Sonapur transmission line. Proper illumination will be provided with emergency communication system, Fire Extinguishers & Fire Buckets and First-aid box. Adequate hygiene condition will be maintained.

Material supply and Storage – The materials are supplied from approved vendors only, Centralized storage facility will be made for storing all the items, cement will be stored indoor to avoid damage, from the centralized store the required items will be shifted though tractors or small trucks to the temporary stores at the sites. Usually, the temporary stores are made near to the tower locations. The following will be maintained for choosing storage areas.

- There will be no overhead line in Material storage area/Work Area.
- Proper approach road at site/Store for material handling.
- There will be no waterlogging
- Ground conditions levelled for material movement and storage

Access roads

Access roads will be typically 12–20 feet wide, but can be wider to accommodate turns. Contractor representatives can work with landowners to find the most practical location for the access road and maximum efforts will be made to use/widening of existing village tracts. They need to be built through environmentally and socially non-sensitive areas. Further, no new access roads will be constructed in the West Aprikola Reserved Forest.

2.2 Profile of the project route

The details of the proposed components of the transmission lines are provided in table below.

Table 2.4: Components of the transmission line

Sl. No.	Particulars	Description
		400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
1	Length of TL route	19.500 km

Sl. No.	Particulars	Description
		400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
2	No. of Transmission Towers	68
3	Circuit type	Single Circuit
4	Type of conductor	Moose
5	Type of tower	400 kV DA, DB, DC, DD, DE - series Tower
6	Insulator used	Porcelain Insulators
7	No. of Angle Points (AP)	60
8	Span	350 m
9	Ground coverage area	Average- 566 sqm.
10	Height of tower	A-46.78m, B-46.5, C-46.5m, D-46.5m
11	Design of tower	A, B, C, D series towers
12	RoW of transmission line	46 m
13	Tower Accessories	Danger plates, number plates, phase plates, circuit plates, anti-climbing plates etc.
14	Minimum ground clearance	8.84 m
15	Access Road	During the construction phase, the project has primarily been dependent upon the existing roads in the study area. In addition to this, access through agricultural lands for equipment and personnel movement will be developed with consultation with stakeholders and local people as per requirement. Further, no new access roads are to be constructed inside the West Aprikola Reserved Forest.

Source: Checked Survey report

The profiling of transmission line towers is provided in the Table 2.5 below.

Table 2.5: Profiling of Transmission Line Towers as per check survey

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line- 19.500 km						
1.	Ext. Tower	91°52'28.24"E 26°2'56.50"N	Agricultural land	Agricultural land		
2.	AP-1	91°52'26.95"E 26°2'57.04"N	Agricultural land	Agriculture land	None	Village Road
3.	AP-1A	91°52'29.08"E 26°3'1.27"N	Agricultural land	Agricultural land	None	Village Road
4.	AP-2	91°52'37.37"E 26°2'57.87"N	Agricultural land	Agriculture land and Non Agriculture land	11KV Line, Existing **400 kV D/C NETC (SRK-BGN) Line**, Proposed Railway Line	Village Road

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
					11KV Line, Metal Road, Hilly and Forest Area	Village Road
5.	AP-3	91°52'44.80"E 26°2'54.20"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
6.	AP-4	91°52'59.90"E 26°2'53.90"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
7.	AP-5	91°53'7.00"E 26°2'55.50"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
8.	AP-6	91°53'15.60"E 26°3'5.20"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
9.	AP-7	91°53'29.20"E 26°3'8.50"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Village Road
10.	AP-8	91°53'47.00"E 26°3'17.30"N	Forest land	Forest land	Pond	Village Road
11.	AP-9	91°53'50.30"E 26°3'22.05"N	Agricultural land	Agriculture land and Non-Agriculture land	Mud Road (2Nos), LT Line(2Nos)	Village Road
12.	AP-10	91°53'51.50"E 26°3'31.80"N	Agricultural land	Agriculture land and Non-Agriculture land	---	Village Road
13.	AP-11	91°54'0.50"E 26°3'35.90"N	Agricultural land	Agriculture land and Non-Agriculture land	Fencing	Village Road
14.	AP-12	91°54'14.50"E 26°3'38.80"N	Agricultural land	Agriculture land and Non-Agriculture land	Pond, Mud Road (2Nos)	Village Road
15.	AP-13	91°54'29.10"E 26°3'38.10"N	Agricultural land	Agriculture land and Non-Agriculture land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
16.	AP-14	91°54'44.10"E 26°3'36.40"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
17.	AP-15	91°54'53.20"E 26°3'42.90"N	Forest land	Forest land		

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
18.	AP-16	91°54'56.40"E 26°3'44.00"N	Forest land	Forest land	**West Aprikola Reserved Forest**	Existing Forest Trail Road
19.	AP-17	91°55'3.20"E 26°3'48.50"N	Agricultural land	Agriculture land and Non-Agriculture land	---	Cart Track
20.	AP-18	91°55'13.65"E 26°3'53.54"N	Agricultural land	Agriculture land and Non-Agriculture land	Mud Road, Pond	Cart Track
21.	AP-19	91°55'26.94"E 26°3'58.90"N	Agricultural land	Agriculture land	---	Cart Track
22.	AP-20	91°55'40.98"E 26°4'2.29"N	Agricultural land	Agricultural land	---	Cart Track
23.	20/1	91°55'44.82"E 26°4'11.61"N	Agricultural land	Agriculture land and Non-Agriculture land	Metal Road, 11 kV Line	Village Road
24.	AP-21	91°55'48.65"E 26°4'20.92"N	Agricultural land	Agriculture land and Non-Agriculture land	Nala	Cart Track
25.	AP-22	91°55'57.66"E 26°4'29.56"N	Agricultural land	Agricultural land and Non-Agriculture land	---	Cart Track
26.	AP-23	91°56'6.85"E 26°4'30.13"N	Agricultural land	Agricultural land and Non-Agriculture land	Pond	Cart Track
27.	AP-24	91°56'10.85"E 26°4'26.33"N	Agricultural land	Agricultural land and Non-Agriculture land	2 Nos LT Line	Village Road
28.	AP-25	91°56'21.02"E 26°4'27.40"N	Forest land	Forest land	West Aprikola Reserved Forest	Existing Forest Trail Road
29.	AP-26	91°56'26.93"E 26°4'28.18"N	Forest land	Forest land	West Aprikola Reserved Forest	Existing Forest Trail Road
30.	AP-27	91°56'37.51"E 26°4'28.90"N	Forest land	Forest land	West Aprikola Reserved Forest	Existing Forest Trail Road

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
31.	AP-28	91°56'47.86"E 26°4'31.03"N	Forest land	Forest land	West Aprikola Reserved Forest	Existing Forest Trail Road
					---	Cart Track
32.	AP-29	91°56'52.00"E 26°4'31.47"N	Agricultural land	Agriculture land and Non-Agriculture land	LT Line, Concrete Road	Village Road
33.	AP-30	91°57'2.35"E 26°4'30.28"N	Agricultural land	Agriculture land and Non-Agriculture land	Pond, Tea Garden, 11 kV Line	Village Road
34.	30/1	91°57'16.17"E 26°4'30.26"N	Agricultural land	Agriculture land and Non-Agriculture land	Tea Garden, Mud Road (2Nos), Metal Road, Nala	Village Road
35.	AP-31	91°57'30.14"E 26°4'30.24"N	Agricultural land	Agriculture land and Non-Agriculture land	Nala, Moram Road	Village Road
36.	31/1	91°57'40.25"E 26°4'29.41"N	Agricultural land	Agricultural land and Non-Agriculture land	---	Cart Track
37.	AP-32	91°57'53.76"E 26°4'28.29"N	Agricultural land	Agricultural land and Non-Agriculture land	---	Cart Track
38.	AP-33	91°58'0.04"E 26° 4'32.11"N	Agricultural land	Agricultural land	Mud Road, Pond (2Nos),Tea Garden	Village Road
39.	AP-34	91°58'3.38"E 26°4'45.05"N	Agricultural land	Agricultural land and Non-Agriculture land	Tea Garden	Tea Garden Road
40.	AP-35	91°58'4.27"E 26°4'54.22"N	Agricultural land	Agriculture land	Tea Garden	Tea Garden Road
41.	35/1	91°58'8.60"E 26°5'3.33"N	Agricultural land	Agriculture land and Non-Agriculture land	Tea Garden	Tea Garden Road
42.	AP-36	91°58'11.80"E 26°5'10.08"N	Agricultural land	Agricultural land	Tea Garden, Pond (2 Nos)	Tea Garden Road
43.	AP-37	91°58'20.32"E 26°5'15.56"N	Agricultural land	Agriculture land and Non-Agriculture land	Tea Garden, Pond	

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
44.	AP-38	91°58'30.59"E 26°5'13.73"N	Agricultural land	Agricultural land		Tea Garden Road
45.	AP-39	91°58'35.92"E 26°5'16.42"N	Agricultural land	Agriculture land	---	Cart Track
46.	AP-40	91°58'37.79"E 26°5'22.54"N	Agricultural land	Agricultural land	11KV Line, EX. 220KV D/C Kiling - Misa TL	Cart Track
47.	AP-41	91°58'43.09"E 26°5'29.98"N	Agricultural land	Agricultural land	---	Cart Track
48.	AP-42	91°58'53.33"E 26°5'34.07"N	Agricultural land	Agriculture land and Non-Agriculture land	Metal Road, Pond	Village Road
49.	AP-43	91°58'58.90"E 26°5'44.76"N	Agricultural land	Agricultural land and Non-Agriculture land	Concrete Road, Nala, 11kV Line	Village Road
50.	AP-44	91°58'58.79"E 26°5'50.84"N	Agricultural land	Agricultural land and Non-Agriculture land	Metal Road, Mud Road	Village Road
51.	AP-45	91°58'58.07"E 26°5'58.69"N	Agricultural land	Agricultural land and Non-Agriculture land	Nursery, Pond, LT Line	Village Road
52.	45/1	91°58'56.58"E 26°6'11.29"N	Agricultural land	Agriculture land	Drain	Village Road
53.	AP-46	91°58'55.25"E 26°6'22.46"N	Agricultural land	Agricultural land	---	Village Road
54.	AP-47	91°58'53.93"E 26° 6'34.14"N	Agricultural land	Agricultural land and Non-Agriculture land	11KV Line, Boundary Wall, Metal Road	Village Road
55.	AP-48	91°58'52.68"E 26° 6'39.48"N	Agricultural land	Agricultural land and Non-Agriculture land	Drain , Railway Line (In between Kamalajari -Tetelia)	Village Road
56.	AP-49	91°58'57.47"E 26° 6'44.47"N	Agricultural land	Agriculture land	---	Cart Track
					---	Cart Track

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
57.	AP-50	91°59'5.86"E 26°6'46.69"N	Agricultural land	Agricultural land		
58.	AP-51	91°59'14.57"E 26°6'54.94"N	Agricultural land	Agricultural land	---	Village Road
59.	AP-52	91°59'15.10"E 26°7'3.91"N	Agricultural land	Agricultural land and Non-Agriculture land	11 kV Line	Village Road
60.	AP-53	91°59'15.62"E 26°7'11.44"N	Agricultural land	Agriculture land and Non-Agriculture land	11 kV Line, NH-27 Crossing (AH-1) (Guwahati-Nagaon)	NH-27
61.	AP-54	91°59'19.10"E 26°7'24.35"N	Agricultural land	Agricultural land	11 kV Line (2 Nos)	Cart Track
62.	54/1	91°59'28.40"E 26°7'30.66"N	Agricultural land	Agriculture land and Non-Agriculture land	---	Village Road
63.	AP-55	91°59'36.99"E 26°7'36.49"N	Agricultural land	Agricultural land	Pond	Cart Track
64.	AP-56	91°59'36.35"E 26°7'43.32"N	Agricultural land	Agricultural land	Pond	Cart Track
65.	AP-57	91°59'33.52"E 26°7'48.01"N	Agricultural land	Agriculture land and Non-Agriculture land	Existing 220 kV D/C Sarusujal-Langpi	Village Road
66.	AP-58	91°59'30.40"E 26°7'50.93"N	Agricultural land	Agricultural land	---	Village Road
67.	AP-59	91°59'34.09"E 26°7'58.24"N	Agricultural land	Agricultural land	---	Village Road
68.	59/1	91°59'43.91"E 26°7'57.61"N	Agricultural land	Agricultural land	Proposed 220 kV D/C LILO Sarusujal-Langpi	Cart Track
69.	AP-60	91°59'51.09"E 26°7'57.15"N	Agricultural land	Agricultural land	Proposed 220 kV D/C LILO Sarusujal-Langpi	Cart Track
70.	Gantry		Substation		Pond	Cart Track

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
		91°59'53.82"E 26°7'57.07"N		Agriculture land and Non-Agriculture land		

Source: Checked Survey report

It is evident from the above Table 2.5 and table 4.5 that,

- The transmission line passes through the agriculture i.e. Paddy (rice), which is a seasonal crops/crops plantation, forest land, tea garden and water bodies.
- No major settlements and cultural heritage within 100 m distance from the center line of RoW of transmission line; However, there are 9 places of worship, 9 Schools, 2 Public health centers, 1 community hall, 1 Forest office, 1 Cemetery, 1 Panchayat office and 1 Library coming within a radius of 500 m from the proposed 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line. Details are provided in **Table 4.5**.
- Most of the transmission towers can be accessed through village roads, and cart tracks etc.

Box 2.1 Ground Clearance for different features

- Crossing another power line: 66kV -3.05, 132 kV and 220 kV- 4.58 m; 400 kV- 5.49 m;
- Telecommunication line: 3.050 m;
- Minimum ground clearance above rail level of the lowest portion of any conductor under condition of maximum sag: 17.9 m;
- Major roads: 12.2 m;
- Minimum ground clearance from power conductor: 7.05 m;
- Minimum vertical midspan clearance between power conductor and earth wire in still air: 8.5 m;

Source: APTRANSCO- Technical Reference book- 2011-vol. ii.

Map showing road network in area is given below.

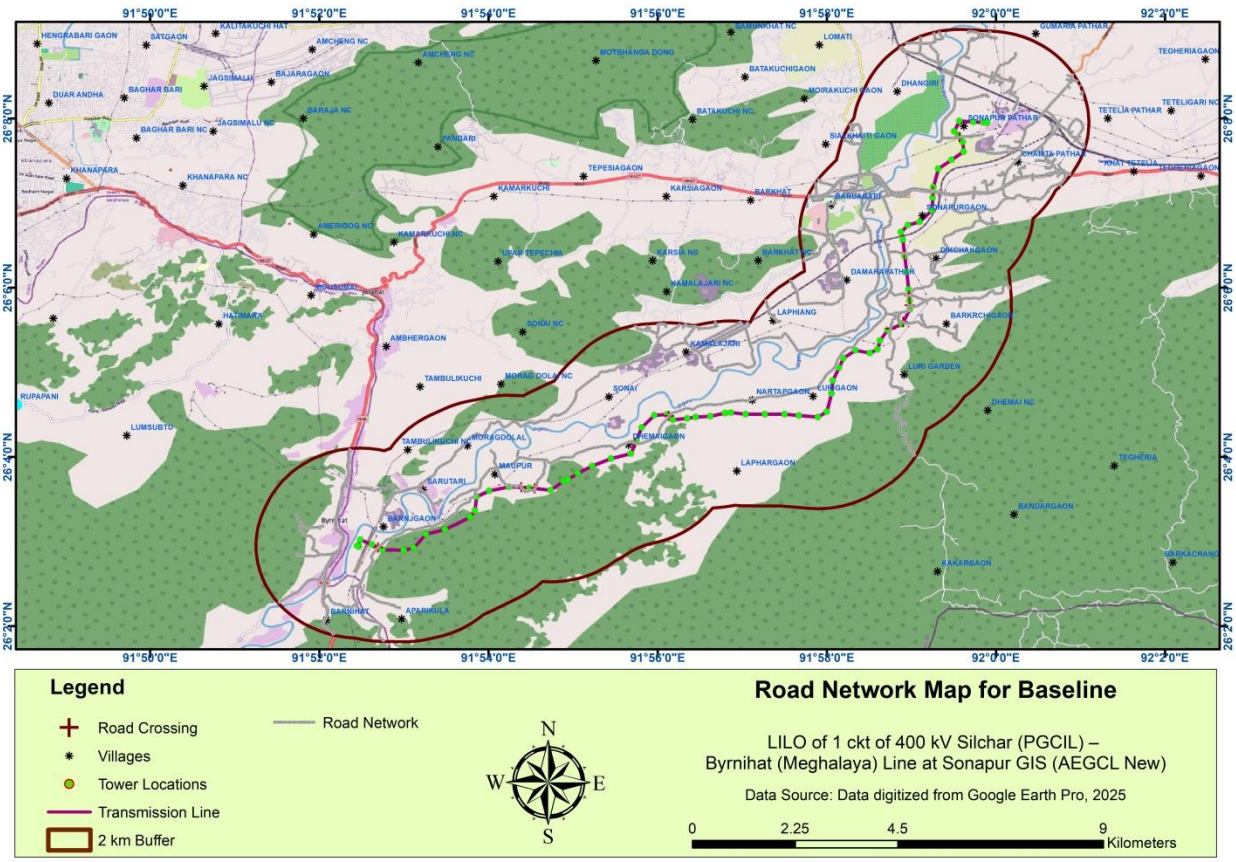


Figure 2.3: Map showing road network in area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat

2.3 Overview of activities during different phases of the project

Construction Phase

A brief on activities under taken during construction phase are given in table below**.**

Table 2.6: Brief on Construction Activities

Activity	Details
Transmission Lines	
Pre-construction Activity	• A reconnaissance, walkover and detailed route survey was carried out to identify the corridor and fixing the alignment; • Preliminary & Detail Survey was conducted for finalizing the tower spotting and alignment of route. • Soil investigation at tower locations was carried out to ascertain the type of foundation to be adopted.
Marking of the Route and Right of Way (RoW)	• The right of way is taken as 46 m for 400kV including both sides from the centre line of the transmission line. • The Tower location will be identified on the ground in accordance with the line route during Check Survey. • Tree enumeration will be finalized as per the Corridor ROW.

Activity	Details
Clearing of Tower Sites	At the tower sites, all vegetation within the footprint of the tower base and for a distance of approximately 2 m beyond the base in all directions will be cleared to ground level.
Foundations for Towers	● Pit marking will be done for the legs of the tower and excavation will be done accordingly. The excavated soil will be stored at the site of each foundation and used for backfilling purposes. Excavated soil ranges from 22.726 m^3 to 619.120 m^3 at tower locations depending on the type of tower and soil strata; ● Foundation for towers will be laid depending upon the type of soils encountered. The formwork, reinforcing bars, the embedded parts of the towers and any earthing elements will be placed in the pits. A concrete cement pad will be laid at the base of the foundation. The depth of foundation below ground will be generally 3.0 - 3.5 m. ● Lag time of 28 days, as specified by the Indian Standards, will be maintained for curing of concrete before erection of the towers. About 50 KL of water will be required at each site for foundation and curing activities. ● The foundation pits will be backfilled following the removal of the formwork with soil excavated from the site itself. The top part of the stub of the tower leg will remain above the ground level after the backfilling. ● The excess soil will be disposed in the surrounding agricultural fields. On an average, 80 m^3 of excess earth will be generated at each tower location. ● Earthing will be done as per specification.
Erection of Towers	The time duration for tower erection ranges between 2 - 3 days for all series of tower. Erection of towers will be done by assembling prefabricated components of the lattice structure followed by straightening and then concreting through hydra cranes. The manpower involved in one tower erection will be minimum 20 workers.
Stringing	● The Tower will be checked for any missing parts and tightness of nuts and bolts before stringing. ● The stringing operations between two sections normally take 2-4 days. The operation involves 'paying off' the conductors and earth wires on the ground and then hoisting them with the help of winch machine/Tensioner Puller for fixing with the towers at both ends along with insulators and hardware. Stringing of the section between two angle towers will be done at a time. ● The tensioning and sagging will be done in accordance with the approved initial stringing charts before the conductors and ground wire will be finally attached to the towers through the ground wire clamps for the ground wire and insulator strings for the conductor as well as earthwires; ● The stringing process requires min 20-25 workers.
Protection of Tower Footing (if required)	Based on site conditions, special measures for protection of foundations are to be taken in respect of locations close to / in nallah, river beds, etc.
Final checking	The final checks are to be done by the concerned Field Officer jointly with the Contractor for foundation and tower footing / protection work, towers and tower accessories, earthing, Conductor, Insulators, Earthwires, RoW & Clearances.

Activity	Details
Testing and Commissioning	● On completion of the construction work, a series of thorough inspections and commissioning tests will be carried out before the Transmission Line will be put into service as Safety Measures for Operation. ● After carrying out final checking there will not be any defects / short comings in the work of the transmission line, the line will be considered as having been completed and clear for energizing.

Source: Detailed & Check Survey report

Operation and Maintenance Phase

EPC contractor is obligated to address any issues arises during defect liability period as per the contract terms. The defect liability period is considered as one year from the date of completion and operational acceptance of the facilities or part thereof. AEGCL will perform required Operation and Maintenance after final handover by EPC contractor. Following are activities to be performed during operation period.

Table 2.7: Brief on Operation Activities

Activity	Details
Transmission Line	
Ground inspection by lineman / team	For 400 kV T/L
Inspection of Towers	Repeated tripping of line-on-line faults and fault is untraceable during ground patrolling.
Thermo-vision scanning	After first charging of T/L
Punctured insulator detection	Lines having insulator de-capping incidents.
Attending all Defects	Foundation- backfilling / soil removal, crack of chimney, tree trimming, cleaning of insulators etc.

Source: Checked Survey report

2.4 Manpower requirements and organization structure

EPC contractor is responsible for the overall engineering, procurement, supply, construction, erection, installation, commissioning of the project. The sub-contractors shall be recruited for the fulfilment of the specific scope of works. Approx. 60 numbers of labour will be engaged by the contractor during construction period. For tower base construction local skilled and unskilled labours are engaged. However, for erection and stringing of towers skilled migrant labours will be engaged.

2.5 Land requirement and allotment process

Land requirement

The land requirement for the transmission lines is summarized as below:

Table 2.8: Summary of Land Requirement for the Project

Project Sub Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Line			
Transmission line RoW (Corridor Width of 46m)	Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar.	89.70	Landowner identification for RoW is anticipated to start from mid-February 2026.
Base are for Tower footing		3.66	Landowner identification for Tower base area has been completed.

Source: Check survey report

The check survey has been completed and approved for 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Line. Landowner identification assessment has been completed for 68 tower footings locations including 13 towers on forest Land and one tower fall in the tea garden area for the 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat transmission line. The compensation is under progress at Circle Office, Sonapur. Once finalized and submitted to the PIU and EPC contractor, the compensation amounts will be disbursed to the respective affected landowners. Moreover, the joint survey for the RoW corridor, to be carried out by the Revenue, Agriculture, Horticulture, and Forest Departments, is anticipated to commence by mid-February 2026 and completed by mid-March 2026. The census survey will be undertaken immediately after the approval of the joint survey report.

Land allotment process

The RoW permission for the transmission line has been obtained in keeping with the requirements of the Electricity Act 2003, the Indian Telegraph Act 1885, MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 and Assam Government Power (Electricity) Department, Dispur, Guwahati-6 and and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

Section 67 (3&4)

(1) A licensee shall, in exercise of any of the powers conferred by or under this section and the rules made thereunder, cause as little damage, detriment and inconvenience as may be, and shall make full compensation for any damage, detriment or inconvenience caused by him or by anyone employed by him.

(2) Where any difference or dispute [including amount of compensation under sub-section

(3) Arises under this section, the matter shall be determined by the Appropriate Commission.

Section 68 (5&6)

(1) Where any tree standing or lying near an overhead line or where any structure or other object which has been placed or has fallen near an overhead line subsequent to the placing of such line, interrupts or interferes with, or is likely to interrupter interfere with, the conveyance or transmission of electricity or to interrupt or interfere with the conveyance or transmission of electricity or the accessibility of any works, an Executive Magistrate or authority specified by the Appropriate Government may, on the application of the licensee, cause the tree, structure or object to be removed or otherwise dealt with as he or it thinks fit.

(2) When disposing of an application under sub-section

(3) an Executive Magistrate or authority specified under that sub-section shall, in the case of any tree in existence before the placing of the overhead line, award to the person interested in the tree such compensation as he thinks reasonable, and such person may recover the same from the licensee.

Explanation-For purposes of this section, the expression tree shall be deemed to include any shrub, hedge, jungle growth or other plant.

- **The Indian Telegraph Act, 1885, Part-III, Section 10 ("e"):**
  "Section *110* - The telegraph authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon any immovable property, Provided that

a) The telegraph authority shall not exercise the powers conferred by this section except for the purposes of a telegraph established or maintained by the [Central Government], or to be so established or maintained;

b) The [Central Government] shall not acquire any right other than that of user only in the property under, over, along, across in or upon which the telegraph authority places any telegraph line or post; and

c) Except as hereinafter provided, the telegraph authority shall not exercise those powers in respect of any property vested in or under the control or management of any local authority, without the permission of that authority, and

d) In the exercise of the powers conferred by this section, the telegraph authority shall do as little damage is possible, and, when it has exercised those powers in respect of any property other than that referred to in clause (c), shall pay full compensation to all persons interested for any damage sustained by them by reason of the exercise of those powers."

- **MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015**
  Ministry of Power (MoP), Government of India (GoI) vide notification no. 3/7/2015-Trans dated 15.10.2015 has issued 'Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines. It is to be noted that the guidelines have proposed compensation to be paid for the base area in between the transmission tower (between four legs) and towards diminution of land value in the width of the RoW corridor due to laying of transmission line @ 85 % and 15 % respectively of the land value as determined by the District Magistrate or any authority based on circle rate/ guideline value/ stamp value/stamp act.
- **Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024),** has notified guidelines for compensation related to Right of Way (RoW) for transmission lines, including urban areas, ensuring uniformity in payments to affected landowners.
  Compensation Structure:
  Tower Base Compensation: 200% of land value for the area enclosed by the four legs of the tower at ground level, plus a one-meter extension on each side.
  RoW Corridor Compensation: 30% of land value for land within the RoW corridor, as per Schedule VII of the Central Electricity Authority.
- **Assam Government Power (Electricity) Department, Dispur, Guwahati-6**
  No.PEI.219/2015/91: The Governor of Assam is pleased to notify the following rates for payment of compensation towards damages in regards to Right of Way for transmission lines. In accordance with the Guidelines of Ministry of Power, Govt of India, vide Ref No. 03/07/2015 Trans, dated 15.10.2015 for maintaining uniformity in compensation payment to the affected land owners during construction of transmission lines, it has been decided that a similar payment methodology towards compensation shall also be adopted in the state of Assam. The guidelines of payment methodology of compensation towards "damages" as stipulated in Section 67 & 68 of the Electricity Act, 2003 read with Section 10 and 16 of Indian Telegraph Act 1885 shall be in addition to the compensation towards normal crop and tree damages. This amount will be payable only for transmission lines supported by tower base of 66kV and above and not for sub-transmission and distribution lie below 66kV.

The following steps would be taken for payment of compensation for RoW of the transmission line.

Table 2.9: Steps wise Procedure for payment of compensation of RoW

Sl. No.	Procedure for payment of compensation
1.	Apply NOC for ROW as per standard format.
2.	Grant of NOC
3.	Issue notice in State Gazette/local newspaper as per standard format.
4.	Detail survey
5.	Check Survey
6.	Assessment, jointly with concerned district administration, of properties likely to be affected and preparation of estimates as per standard formats and verify the same.
7.	Finalization of tower design/ tower structure/ tower foundation/ tower testing.
8.	Assisting district administration in preparation of valuation report based on Govt. approved rates.
9.	Working out compensation amount to be paid to the individual beneficiaries
10.	Completion of the Assessment report/estimate and countersignature by Circle Officer and verify the same by concerned officials of AEGCL.
11.	Preparation of Provisional Notice as per format, countersigned by Circle Officer and acknowledgement from beneficiaries.
12.	Preparation of Compensation Receipt as per format and countersignature by Circle Officer
13.	Serving the provisional notice to individual beneficiaries and obtaining their acknowledgement.
14.	Documents collection from affected person.
15.	Submission of proposal to HQ for requisition of fund along with all approved documents
16.	Re-Checking of all documents and Payment to individual beneficiaries and acknowledgment to be obtained on each receipt.
17.	Disbursement of compensation directly from AEGCL.

Source: AEGCL T/L Manual

The following process will be complied:

- RoW of transmission Line passing through private lands, the clearance shall be obtained by EPC contractor in liaising with concern revenue department and other line departments for determining the Land compensation and *zirat* value.
- The Land compensation amount will be paid directly by AEGCL to project affected person as per the assessment of the district administration.
- Moreover, the *zirat* compensation will be paid by EPC contractor for which the reimbursement of the same shall be made by the AEGCL.
- The documents required to be obtained from the landowners for disbursement of Compensation for tower footing, RoW and *zirat* compensation, etc. shall be Aadhar card/Voter ID/or other valid identity card, Bank details as per UID, *Jamabandi*[2] A copy/ *Khajana* receipt, next to kin certificate (where required), NOC for land use, etc.
- Further, PIU need to communicate to all stockholders/departments for providing various

[2] **Jamabandi** is the official record of rights (land record) maintained by the revenue department, detailing land ownership, land type, area, and revenue information. It is widely used in India—especially in Assam—for verifying ownership during land acquisition, compensation, resettlement, and social impact assessment processes.

government rates for compensation of crop damage, plantation damage, tree cutting, trimming, utilities, etc. that will be damage8d during construction works.

- EPC to obtain all statutory clearance if any required, such as Railway crossing, NHA etc. & any clearance require from Power Grid etc.

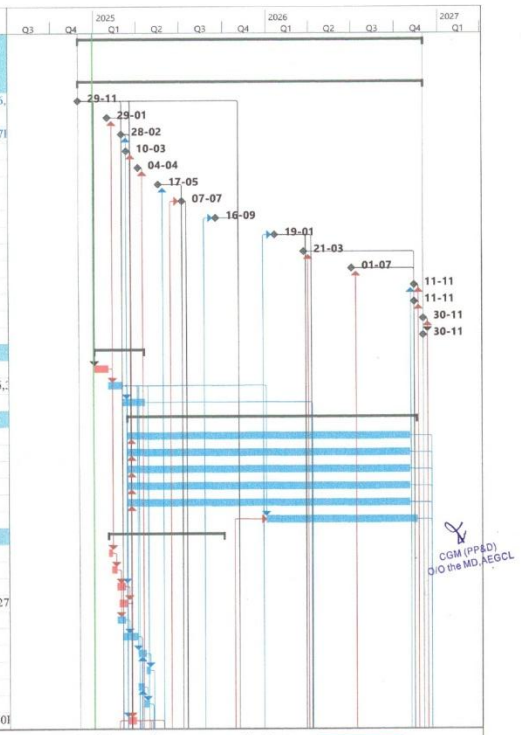
2.6 Costs and implementation schedule

Cost of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line
Supply Portion – Rs. 979,846,692.50 with GST.
Erection Portion – Rs. 142,953,414.60 with GST.

Implementation schedule

The detailed implementation schedule has been approved by AEGCL. The details of work progress as per L2 schedule is presented below.

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
1	**LILO of one circuit of Silchar – Byrnihat 400kV TL (on twin moose) & LILO of both circuits of Karbi Langpi-Sarusajai 220kV line at 400kv Sonapur S/S with**	**627 days**	**29-11-24**	**30-11-26**		
2	**Milestones**	**627 days**	**29-11-24**	**30-11-26**		
3	Contract Signing	0 days	29-11-24	29-11-24		19FS+28 days,59,66,
4	Tower Spotting data Approval	0 days	29-01-25	29-01-25	19	80,87,73,101
5	Detailed Survey completion	0 days	28-02-25	28-02-25	20	73,80FS+15 days,87I
6	Tower Schedule & Profile Drawing. Approval	0 days	10-03-25	10-03-25	33	40
7	Structural Drawing Approval	0 days	04-04-25	04-04-25	41	74
8	Foundation Drawing Approval	0 days	17-05-25	17-05-25	43	120
9	Stubs & Bolt Delivery start	0 days	07-07-25	07-07-25	64SS	120
10	Tower Structure Delivery Start	0 days	16-09-25	16-09-25	78SS	123
11	Conductor, Earth wire, OPGW delivery start	0 days	19-01-26	19-01-26	85SS,92SS	127,128
12	Tower Foundation completion	0 days	21-03-26	21-03-26	120	130
13	Tower Erection Completion	0 days	01-07-26	01-07-26	123	130
14	Tower Stringing work completion	0 days	11-11-26	11-11-26	127,128	130
15	Tower Accessories completion	0 days	11-11-26	11-11-26	124	130
16	CEA Inspection completion	0 days	30-11-26	30-11-26	131	17
17	Completion of Project	0 days	30-11-26	30-11-26	16	132
18	**Survey**	**91 days**	**01-01-25**	**16-04-25**		
19	Route Alignment & Tower spotting	25 days	01-01-25	29-01-25	3FS+28 days	4,30,20
20	Detailed Survey	26 days	30-01-25	28-02-25	19	5,21,28,44,46,59,36,2
21	Check Survey	40 days	01-03-25	16-04-25	20	120FF
22	**Approvals**	**528 days**	**11-03-25**	**16-11-26**		
23	NH/SH Crossing	515 days	11-03-25	31-10-26	33	132FF
24	Power Line crossing	515 days	11-03-25	31-10-26	33	132FF
25	Railway Line crossing	515 days	11-03-25	31-10-26	33	132FF
26	Forest Proposal	515 days	11-03-25	31-10-26	33	132FF
27	Aviation Proposal	515 days	11-03-25	31-10-26	33	132FF
28	PTCC Proposal	275 days	31-12-25	16-11-26	20,123SS+50 days	132FF
29	**Design & Engineering**	**210 days**	**30-01-25**	**01-10-25**		
30	Tower spotting Data submission	6 days	30-01-25	05-02-25	19	31
31	Tower Spotting Data Approval	9 days	06-02-25	15-02-25	30	32,34
32	Tower Schedule & Profile Drawing. Submission	15 days	17-02-25	05-03-25	20FS-12 days,31	33FS-11 days
33	Tower Schedule & Profile Drawing. Approval	15 days	21-02-25	10-03-25	32FS-11 days	40,44,23,24,25,26,27
34	Tower Design Submission	15 days	17-02-25	05-03-25	31	35FS-5 days
35	Tower Design Approval	27 days	28-02-25	31-03-25	34FS-5 days	60,74
36	Soil Investigation Report Submission	15 days	02-04-25	18-04-25	20,117	37
37	Soil Investigation Report Approval	7 days	19-04-25	26-04-25	36	42
38	Earth Resistivity Test Report Submission	10 days	02-04-25	12-04-25	117	39
39	Earth Resistivity Test Report Approval	10 days	14-04-25	24-04-25	38	46
40	Tower Structure Drawing Submission	15 days	11-03-25	27-03-25	33,20,6	41,48FS+50 days,50I



Project: "Construction of 400/220 kV GIS-Sonapur SS & Associated TR line with Bay Extension- Pakage(H)"
Schedule: L2 TR Line

Page 1

2.7 Existing and associated facilities of the project

The 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat transmission line is existing operational assets of (AEGCL) which were constructed and commissioned prior to the proposed LILO lines and without AIIB financing. The line exists independently of the LILO line and was developed to serve prior or ongoing transmission needs. While the LILO at Sonapur S/s will connect to the line respectively, the existing line does

not require modification, expansion, or redevelopment under the current project scope. In view of the above, the existing transmission line is not classified as an associated facility under the AIIB ESF.

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter describes provisions of Constitution of India, various applicable laws, regulations and policies of Government of India (GoI) and Government of Assam (GoA), International conventions and the Asian Infrastructure Investment Bank (AIIB).

3.1 Provisions of Constitution of India

As a sequel to the UN Conference on the Human Environment (1972), Indian Parliament in 1976 amended the Constitution of India by introducing articles 48A and 51A. These articles incorporated environmental concerns into the Directive Principles of state policy and postulated as a fundamental duty of all citizens to preserve and protect the environment.

3.2 GOI and GOA Laws/Regulations/Policies

Table 3.1: Environmental and Social Policies and Regulatory Requirements (National and Assam State Regulation)

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
Environmental Regulations					
1.	The Electricity Act, 2003	An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas.	Central Electricity Authority, Regulatory Commissions and establishments	Applicable, transmission line projects are constructed under the ambit of Electricity Act, 2003 following the provisions of Section 67 & 68 of act which mandates licensing for the entities involved in the construction, operation and maintenance of the project. Contractor to follow all the requirements as per the Act.	EPC Contractor / PMC / AEGCL
2.	EIA Notification, 2006 and subsequent amendments	Projects indicated in the schedule of this notification require EIA study and environmental clearance.	Ministry of Environment, Forest and Climate Change (MoEF & CC) or State Environmental Impact Assessment Authority (SEIAA)	Not Applicable, transmission line project does not come under purview EIA Notification 2006 and its subsequent amendments. Thus, Environmental Clearance is not	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				required. However, project associated activities like creation of borrow area (if any) extraction of boulders, River Sand etc. for the project will require prior Environmental Clearance.	
3.	National Environment Policy (NEP), 2006	NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by Central, State and Local Government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management.	MoEF & CC/CPCB MoEF&CC, GoI, CPCB/SPCB, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati,	Applicable, should adhere to NEP conservation of environmental resources and abatement of pollution.	EPC Contractor / PMC / AEGCL
4.	The National Green Tribunal Act, 2010	An act established for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and	National Green Tribunal (NGT)	Applicable, respected to area where development activities may cause any damage to environment and property. Should adhere to NGT mandate.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		compensation for damages to persons and property and for matters connected therewith or incidental thereto.			
5.	Environment Protection Act, 1986 and subsequent amendments and rules Eco-Sensitive Zone Notifications	An umbrella act for environmental protection in India. Various rules, notifications and standards established under the Act. Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards notified.	MoEF & CC/CPCB MoEF&CC, GoI, CPCB/SPCB, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati,	Applicable, comply with applicable standards for ambient air, air emission, effluents, receiving water bodies, and drinking water at the consumer end.	EPC Contractor / PMC / AEGCL
6.	Biological Diversity Act, 2002 Assam Biodiversity Rules, 2010	The Act provides a comprehensive legal framework for conservation and sustainable use of bio-resources reflects a strict regime for access, control and benefit sharing. It restricts access and use of biological resources by outsiders and creates decentralized institutional structures for conservation of biological diversity.	National Biodiversity Authority (NBA), Assam State Biodiversity Board (ASBB) and Biodiversity Management Committees (BMCs)	Applicable, should adhere measures as per the Act.	EPC Contractor / PMC / AEGCL
7.	The Forest (Conservation) Act,1980 and subsequent amendments and rules	As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the Central Government	MoEF&CC, GoI, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati	Applicable, since Reserved Forest land is involved in the project.	EPC Contractor / PMC / AEGCL
8.	National Forest Policy 1988	It articulates the twin objectives of ecological stability and social justice; recognizes people's dependence	Department of Environment and Forest, Assam, MoEF&CC, New Delhi	Applicable, since Reserved Forest land is involved in the project.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		and their symbiotic relation with forest, emphasizes protection of people's rights over forest resource and offers space for participation of forest dependent communities in the conservation, protection and management of state-owned forests.			
9.	Assam Forest Policy, 2004	This policy is to ensure progressive sustainable development of the forests of Assam, to meet the twin objectives of environmental stability and ecological balance together with improved livelihood support system for people.	Department of Environment and Forest, Assam	Applicable, since Reserved Forest land is involved in the project.	EPC Contractor / PMC / AEGCL
10.	The Compensatory Afforestation Fund Act, 2016 State Compensatory Afforestation Fund Management and Planning Authority Forest (Conservation) Amendment Rules, 2014	This act provides for the establishment of funds under the public accounts of India and the public accounts of each State and crediting thereto the monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980. The collected funds will be utilized for afforestation, regeneration of forest	Department of Environment and Forest, Assam and MoEF&CC, New Delhi	Applicable, since Reserved Forest land is involved in the project.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		system, wildlife protection and infrastructure development			
11.	The Assam Compensatory Afforestation Fund Rules, 1994	Provision to constitute a Fund for the purpose of Compensatory Afforestation to be raised against the Forest Area diverted for non-forest use under the provisions of Section 4(1) of the Forest (Conservation) Act, 1980	Department of Environment and Forest, Assam	Applicable, since Reserved Forest land is involved in the project.	Forest Department, Assam
12.	Assam (Control of Felling & Removal of trees from Non-Forest Land) Rules 2002 and subsequent amendment	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.	Department of Environment and Forest, Assam	Applicable	EPC Contractor / PMC / AEGCL
13.	The Assam Trees Outside Forest (Sustainable Management Rules), 2022	Provides regulation for Tree Cutting Permission outside forest in a sustainable manner.	Department of Environment and Forest, Assam (PCCF, DFO)	Applicable if tree felling requires during the construction of the sub-projects	EPC Contractor / PMC / AEGCL
14.	Wildlife Protection Act, 1972 and Subsequent Amendments	The Act provides for the protection of wildlife and for all matters that are connected to wildlife and their	Department of Environment and Forest, Assam, NBWL, SBWL	Not applicable as per MOEF&CC Notification dated 17 May 2022.	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		habitat. This Act prohibits destruction, exploitation or removal of any wildlife, and provides for protection to listed species of flora and fauna.		Transmission Lines are not located within the boundaries of protected areas.	
15.	Air (Prevention and Control of Pollution) Act, 1981 and subsequent amendments The Air (Prevention & Control of Pollution) Assam Rule, 1991	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards.	State Pollution Control Board, Assam.	Applicable, implement measures to mitigate air pollution from project activities; construction facilities.	EPC Contractor / PMC / AEGCL
16.	Noise Pollution (Regulation and Control Act) 2000 and subsequent amendments	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Central Pollution Control Board & State Pollution Control Board, Assam	Applicable, contractors to ensure all noise-producing activities during civil works conform to standards	EPC Contractor / PMC / AEGCL
17.	Water Prevention and Control of Pollution) Act, 1974 and subsequent amendments The Water (Prevention & Control of Pollution) Assam Rule, 1977	Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, by Central and State Pollution Control Boards and for conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Control of water pollution is achieved through administering conditions imposed in consent issued under	State Pollution Control Board, Assam. Prevention of water pollution due to project activities	Applicable, implement measures to mitigate water pollution from project activities; construction facilities.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		provision of the Water (Prevention and Control of Pollution) Act of 1974.			
18.	Wetland (Conservation and Management) Rules, 2010, 2017	The Rules specify activities which are harmful and prohibited in the wetlands such as industrialization, construction, dumping of untreated waste and effluents, and reclamation. The Central Government may permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	Central Wetlands Regulatory Authority (CWRA)	Not Applicable, none of the T/L falls within notified wetland areas.	
19.	Hazardous & Other Waste (Management and Transboundary Movement) Rules, 2016	Protection to general public against improper handling, storage and disposal of hazardous waste. The rules prescribe the management requirement of hazardous wastes from its generation to final disposal.	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	Applicable, Hazardous & Other Waste generated will be managed and disposed off as per requirement.	EPC Contractor / PMC / AEGCL
20.	Construction and Demolition Management Rule 2016 of MOEF & CC (26 March 2016)	Applies to everyone who generates construction and demolition waste. Every waste generator shall segregate construction and demolition waste and deposit at collection center or handover it to the authorized processing facilities Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains.	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	Applicable, follow all the rules in managing construction debris and waste (soil, road debris etc.,) during construction works	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
21.	Solid Waste Management Rules 2016	Rules for management of municipal solid waste. Responsibility of solid waste generator include waste segregation, and no throwing, burning or burry the solid waste generated on streets, open public spaces outside the premises or in the drain or water bodies, storage and disposal as per the rules.	State Pollution Control Board, Assam and Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plans for its safe disposal/burial.	Applicable, follow all the rules in managing solid waste during construction works activities	EPC Contractor / PMC / AEGCL
22.	E-waste Management Rules, 2016	The rules are applicable to the consumers of electrical and electronic equipment. Large consumers of electrical and electronic equipment are required to ensure that e-waste generated by them is channelized through authorized collection centres or service providers to authorized dismantler or recycler. Additionally, records for e-waste are to be maintained for the State Pollution Control Board.	Central Pollution Control Board & State Pollution Control Board, Assam	Applicable	EPC Contractor / PMC / AEGCL
23.	Batteries (Management and Handling) Rules, 2001	By notification dt. 16th May 2001 under Sections 6, 8 and 25 of the Environment (Protection) Act 1986, the MoEF&CC has put certain restrictions on the disposal and handling of used batteries under this rule.	State Pollution Control Board, Assam	Not Applicable	-
24.	Central Motor Vehicle Rules, 1989	To minimize the road accidents, penalizing the guilty, provision of	Commissionerate of Transport (District Transport	Applicable during transportation of manpower and	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		compensation to victim and family and check vehicular air and noise pollution.	Offices, Assam)	construction material. Also applicable during the use of construction equipment and vehicles.	
25.	The Mines and Minerals (Development and Regulation) Act, 1957	For development and regulation of mines and minerals in a sustainable manner. The rules regulate the mining of mineral and dealerships for mining and trading.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	Applicable, as the construction works shall require stones, aggregates, sand, earth, etc.	EPC Contractor / PMC / AEGCL
26.	Assam Minor Mineral Concession Rules, 2013 and subsequent amendment, 2021	Provide regulations established by state governments or relevant authorities to govern the extraction and management of minor minerals. The amendment prescribes the rates (as per the 3rd schedule) at which Royalties shall be paid when minor minerals are used or consumed by Government Agencies.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	Applicable, as the construction works shall require stones, aggregates, sand, earth, etc.	EPC Contractor / PMC / AEGCL
27.	Disaster Management Act, 2005	This act provides an effective management of disasters and for matters connected therewith or incidental thereto.	Assam State Disaster Management Authority (ASDMA)	The subproject areas fall under the seismic zone V and hence any construction activities/ interventions will be under purview of this act.	EPC Contractor / PMC / AEGCL
28.	Assam State Disaster Management Policy 2010	The policy provides measures' to be adopted for prevention and mitigation of disaster; mitigation measure to be integrated with development plans and projects; build capacity and preparedness	Assam State Disaster Management Authority (ASDMA)	The subproject areas fall under the seismic zone V and hence any construction activities/ interventions will be under purview of this act.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		measure; and specify roles and responsibilities to each dept. in relation to adopted measure.			
29.	Energy Conservation Act, 2001	This act provides for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.	Inspectorate of Electricity (IEC), Assam	Applicable all project activities involve use of energy efficient equipment etc.	EPC Contractor / PMC / AEGCL
30.	National Building Code, 2016	The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines. For regulating the building construction activities across the country. The code provides the 'accepted standards' in relation to material specification, testing or other related information. The code provides development control rules and general building requirements (e.g. floor area ratio, specifications on building design, etc.).	Approval building plan from appropriate agency.	Not Applicable	-
31.	Guidelines to Regulate and Control Ground Water Extraction in India, 2019	This act regulates and control ground water extraction for various construction purpose.	Central Ground Water Board (CGWB)	Not Applicable	-
Social Regulations					
32.	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement	The act aims to provide fair compensation to landowners and ensure transparency in land acquisition processes. Additionally, it focuses on the rehabilitation and resettlement of affected persons.	State Revenue Department/ District Administration Ministry of Social Justice & Empowerment/ Commissionerate of Labour,	Not Applicable as involuntary land acquisition is not triggered Yes. For all the sub-project where Persons with Disabilities are	AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	Act, 2013 Rights of Persons with Disabilities Act, 2016	It gives effect to the proclamation on the full participation and equality of the persons with disabilities and provides the right to equality, life with dignity, and respect for his or her own integrity equally with others.	Government of Assam	present and affected persons. Would comply with relevant provision of the Act.	
33.	The Indian Telegraph Act, 1885, Part-III, Section 10 ("e"):	Section *110* - The telegraph authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon any immovable property	Central Telegraph Authority	Applicable for T/L project.	EPC contractor / PMC / AEGCL
34.	MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 And new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.	Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines	Ministry of Power, Govt. of India	Applicable for T/L project.	EPC contractor / PMC / AEGCL
35.	Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated	Guidelines for compensation related to Right of Way (Row) for transmission lines	Ministry of Power, Govt. of India	Applicable for T/L project.	EPC contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	14.06.2024*)*				
36.	Assam Government Power (Electricity) Department, Dispur, Guwahati-6	Payment of compensation towards damages in regards to Right of Way for transmission lines	Assam Government Power (Electricity) Department	Applicable for T/L project.	EPC contractor / PMC / AEGCL
37.	Right to information Act, 2005	The Act provides 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, contain corruption.	Directorate of Economics and Statistics, Government of Assam	The project activities come under the preview of Right to Information Act and any citizen can obtained any information about any aspect of the project. All documents pertaining to the project would be disclosed to public.	EPC Contractor/PMC /AEGCL
38.	Forest Right Act, 2006 /Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	This is an act to recognize and vest the forest rights and occupation in forest land in forest dwelling scheduled tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded; to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The Act provides for use, access and ownership to forest resources, biodiversity and provision for benefit sharing for ST	Department of Environment and Forest, Assam and District Administration	Not Applicable, no notified forest land within the subproject area	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		and other forest dwelling communities.			
39.	Direct Purchase Policy, 2023	In the States policy of Direct Purchase of land, the affected land, immovable assets and other assets attached with the land will be evaluated by the District Level Direct Purchase Committee (DLLPC) according to sections 26 to 30 & Schedule I of RFCTLARR Act 2013 along with Multiplication factor of Assam. The land owners will get an incentive of 25%, inclusive of R&R Benefits, on the compensation calculated as per provisions of Section 26 to 30, Valuation of immovable assets & Schedule I of RFCTLARR Act 2013, as he has readily agreed to be a part of the project assets & Schedule I of RFCTLARR Act 2013, as he has readily agreed to be a part of the project.	Revenue & Disaster Management (LR) Department, Govt. of Assam	Will not be triggered for the TL.	
40.	The Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010	The Act aims to stop the rampant encroachment and construction around the monuments and other sites of archaeological importance. As per the Act, construction is prohibited in a radius of 100 meters from a protected monument and is regulated in a radius of >100-300 meters from a protected monument. Permission of the	Archaeological Survey of India (ASI), Go	No notified Archaeological site is located within 300m of the sub project. However, if any chance findings finds during the construction of TL mitigation measures will be taken.	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		National Monuments Authority needs to be taken in case of repair/renovation in the prohibited area or regulated area.			
41.	Government of India Act, 1935 (6th Schedule)	The Sixth Schedule under Article 244(2) and 275(1) provides for the formation of autonomous administrative divisions — Autonomous District Councils (ADCs) — that have some legislative, judicial, and administrative autonomy within a state	District Autonomous council	Not Applicable	
Labour Laws Applicable to Establishments Engaged in Building and Other Construction Work					
42.	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	It regulates the employment and conditions of service of building and other construction workers and provides for their safety, health and welfare.	Commissioner ate of Labour, Government of Assam	Applicable to ensure safety and welfare measures for workers employed at construction sites. License, Safety and welfare measures for work force employed at construction sites are to be regulated in conformity with this act. Should adhere and follow the act.	EPC Contractor/PMC /AEGCL
43.	Workmen Compensation Act, 1923	It provides for payment of compensation by employers to their employees for injury/ fatalities / disablement by accident including occupational disease.	Commissioner ate of Labour, Government of Assam	Applicable because contractor shall be applying large number of labours during construction which will include both Men and Women. Should follow as per the requirement of the Act,	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
44.	Employees State Insurance Act, 1948	Employees State Insurance Act provides sickness benefit, maternity benefit (Female employees), disablement benefit, dependent's benefit and medical benefits as specify in the act to the employees.	Commissioner ate of Labour, Government of Assam	Applicable Should follow as per the requirement of the Act,	EPC Contractor/PMC /AEGCL
45.	The Child Labour (Prohibition & Regulation) Act, 1986 and subsequent Amendments	The Child Labour (Prohibition & Regulation) Act is aimed at regulating the employment of children and prohibiting the engagement of children in certain occupations and processes. It seeks to protect the rights of children and ensure their well-being.	Commissioner ate of Labour, Government of Assam	There should not be any child labour (less than 14 years) engaged in any project activity and adolescents (above 14 and less than 18 years) in any hazardous activity. Should follow as per the requirement of the Act.	EPC Contractor/PMC /AEGCL
46.	Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013 (POSH Act)	The Act is meant to serve as guidelines for the employees subject to the provisions of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. It aims to set out effective measures to avoid & to eliminate & if necessary to impose punishment for any sexual harassment in the workplace.	District Administration	Applicable. If women workers at project workplaces are engaged. It will safeguard and protect women involved in the project from Sexual Harassment. Should adhere as per the requirement of the Act.	EPC Contractor/PMC /AEGCL
47.	Contract Labour (Regulation & Abolition) Act 1970 along with the rules, 1971	The objective of the Contract Labour Regulation and Abolition) Act, 1970 is to prevent exploitation of contract labour and also to introduce better conditions of work.	Commissioner ate of Labour, Government of Assam	Contractors shall employ work-force during Construction. The Act applies to the Principal Employer of an Establishment and the Contractor	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				where in 20 or more workmen are employed or were employed even for one day during preceding 12 months as Contract Labour. Should comply as per the requirement of the Act.	
48.	Minimum Wages Act, 1948 along with Central Rules, 1950 The minimum wages rules Assam 1952	To ensure that workman gets at least minimum wages as fixed by Govt. Minimum wages sets the lowest limit below which wages cannot be allowed to sink.	Commissioner ate of Labour, Government of Assam	Applicable, Contractor should comply minimum wages act.	EPC Contractor/PMC /AEGCL
49.	Payment of Gratuity Act, 1972 The payment of gratuity rules Assam 1972	This act provides for a scheme for the payment of gratuity to employees engaged and completed 5 or more years of service with employer.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should adhere the both Gratuity Act and Rules.	EPC Contractor/PMC /AEGCL
50.	Employees Provident Fund and Miscellaneous Provision Act, 1952 along with EPF Scheme Rules and Forms	It is a beneficent piece of social welfare legislation aimed at promoting and securing the well-being of the employees.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should adhere the Act.	EPC Contractor/PMC /AEGCL
51.	Maternity Benefit Act, 1961 and subsequent amendment, 2017; Assam Maternity benefit Rules 1965	This act provides provision for maternity leave for women, during pregnancy and after giving birth and some other benefits to women employees, in case of medical recommendation of bed rest or miscarriage etc.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should follow as per the requirement of the Act.	EPC Contractor/PMC /AEGCL
52.	The Bonded Labour	An Act to provide for the abolition of bonded	Commissionerate of Labour,	Applicable, Contractor will	EPC Contractor/PMC

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	(Abolition) Act 1976 Bonded Labour System (Abolition) Rules 1976	labour system with a view to preventing the economic and physical exploitation of the weaker sections of the people and for matters connected therewith or incidental thereto	Government of Assam	ensure that there is no Bonded Labour in the project.	/AEGCL
53.	Code on Occupational Safety, Health and Working Conditions, 2020	This is a comprehensive code regulating the occupational safety, health and working conditions of the persons employed in an establishment and for matters connected therewith.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should follow as per the requirement.	EPC Contractor/PMC /AEGCL
54.	National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	NIOSH has laid down criteria for a recommended standard: occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed.	Commissionerate of Labour, Government of Assam	Applicable, contractors are required to provide hearing-protection equipment and ensure exposures of workers to noise-generating activities are within allowed NIOSH standards.	EPC Contractor/PMC /AEGCL
55.	National Policy on Safety, Health and Environment at Workplace, 2009	The policy provides an action program for enforcement of national standards on occupational health and safety at construction works, testing and laboratories.	Commissionerate of Labour, Government of Assam	Applicable for ensuring safety of the workforce during the transmission line construction under the project. Contractor should follow as per the requirement in the construction sites.	EPC Contractor/PMC /AEGCL
56.	Equal Remuneration Act, 1976 along with allied Rules	An Act to provide for the payment of equal remuneration to men and women workers and for the prevention of discrimination, on the ground of sex, against women in the matter of employment	Commissionerate of Labour, Government of Assam	Applicable, Needed compliance of regulations as per the requirement.	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		and for matters, connected therewith or incidental thereto.			
57.	Inter-state Migrant Workers Act, 1979	The purpose of this act is to protect workers whose services are requisitioned outside their native states in India. Whenever an employer faces shortage of skills among the locally available workers, the act creates provision to employ better skilled workers available outside the state.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should comply if migration labours are engaged in construction work.	EPC Contractor/PMC /AEGCL

Table 3.2: International Conventions

Sl. No.	Conventions/Treaties/Declarations	Applicability to the project
A. Nature conservation (Forestry and Wildlife)		
1.	Ramsar Convention on Wetlands, 1971	No
2.	CITES, 1973 (Convention on International Trade in Endangered Species of Fauna and Flora)	No
3.	TRAFFIC, 1976 (The Wildlife Trade Monitoring Network)	No
4.	Bonn Convention, 1979 (Convention on the Conservation of Migratory Species)	Yes, flyway involved
5.	CAWT, 2005 (Coalition Against Wildlife Trafficking)	No
6.	CBD, 1992 (Convention on Biological Diversity)	No
7.	Commission on Sustainable Development, 1992	No
8.	ITTA, 1983 (International Tropical Timber Agreement)	No
9.	UNFF, 2000 (United Nations Forum on Forests)	No
10.	IUCN-World Conservation Union, 1948 (International Union for Conservation of Nature and Natural Resources)	No
11.	GTF, 1994 (Global Tiger Forum)	No
B. Hazardous material		
1.	Cartagena Protocol on Biosafety, 2003	No
2.	Nagoya Protocol, 2010	No
3.	SAICM, 2006 (Strategic Approach to International Chemicals Management)	No
4.	Stockholm Convention on Persistent Organic Pollutants (POPs), 2001	No
5.	Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and Their Disposal, 1989	No
6.	Rotterdam Convention on Prior Informed Consent (PIC) for certain Hazardous Chemicals and Pesticides in International Trade, 1998	No
C. Atmospheric emissions		

Sl. No.	Conventions/Treaties/Declarations	Applicability to the project
1.	UNFCCC (United Nations Framework Convention on Climate Change), 1992	No
2.	Kyoto Protocol, 1997	No
3.	UNCCD (United Nations Convention to Combat Desertification), 1994	No
4.	Montreal Protocol (on Ozone Depleting Substances), 1987	No
D. Marine environment		
1.	IWC (International Whaling Commission), 1946	No

Table 3.3: International Labour Law Conventions

Sl. No.	International Labour Law Convention	Stipulation/ Terms and Conditions
1.	Forced Labour Convention, 1930 (No. 29)	Prohibits all forms of forced or compulsory labour, which is defined as "all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily." The convention also requires that the illegal extraction of forced or compulsory labour is punishable as a penal offence and that ratifying states ensure that the relevant penalties imposed by law are adequate and strictly enforced.
2.	Abolition of Forced Labour Convention, 1957 (No. 105)	Prohibits forced or compulsory labour as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social, or economic system; as a method of mobilizing and using labour for economic development; as a means of labour discipline; as a punishment for having participated in strikes; and as a means of racial, social, national, or religious discrimination
3.	Equal Remuneration Convention, 1951 (No. 100)	Lays out the principles for equal remuneration for work of equal value and addresses gender discrimination
4.	Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Prohibits all discrimination and exclusion on any basis including of race or colour, sex, religion, political opinion, national or social origin in employment and repeal legislation that is not based on equal opportunities
5.	Minimum Age Convention, 1973 (No. 138)	To ensure the effective abolition of child labour and to raise progressively the minimum age for admission to employment or work. India has ratified this convention with a minimum age of 14 years
6.	Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, 1999 (No. 182)	Prohibition and elimination of the worst forms of child labour, including slavery, forced labour and trafficking in human beings. It prohibits the use of children in armed conflicts, prostitution and pornography, illegal activities such as drug trafficking and dangerous work.

3.3 Applicability of AIIB Environmental and Social Policy

AIIB is an international financial organization that provides a multilateral financing and investment platform for infrastructure development and enhanced interconnectivity in Asia. AIIB recognizes that E&S sustainability is a fundamental aspect of achieving outcomes consistent with its mandate to support

infrastructure development and enhance interconnectivity in Asia. The objective of AIIB's Environmental and Social Policy (ESP) is to facilitate achievement of these development outcomes, through a system that integrates sound Environment and Social (E&S) management into projects. ESP sets forth mandatory E&S requirements for AIIB's investments accomplished with the following:

A. Environmental and Social Standards (ESSs)

ESS 1: Environmental and Social Assessment and Management

ESS1 aims to ensure the environmental and social soundness and sustainability of projects and to support the integration of environmental and social considerations into the project decision-making process and implementation. ESS 1 is applicable if the project is likely to have adverse environmental risks and impacts or social risks and impacts (or both).

The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the project. ESS 1 provides for both quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during the course of project implementation. The ESS 1 defines the detailed requirements of the environmental and social assessment to be carried out for any project to be financed by the AIIB.

ESS 1 is applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

ESS 2: Land Acquisition and Involuntary Resettlement

ESS 2 is applicable if the project's screening process reveals that the project would involve involuntary resettlement (including involuntary resettlement of the recent past or foreseeable future that is directly linked to the project). Involuntary resettlement covers physical displacement (relocation, loss of residential land or loss of shelter) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources or means of livelihood) as a result of: (a) involuntary acquisition of land; or (b) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers such displacement whether such losses and involuntary restrictions are full or partial, permanent or temporary. The ESS 2 defined detailed requirements of resettlement planning of the projects involving involuntary resettlement.

Permanent restricted use of land is required for the tower footing area. However, ownership of the land will remain with the respective landowners. There will be temporary restrictions of land use within the RoW. Agricultural activities will be allowed to continue within the RoW after construction; however, for the tower base area, it is recommended that agricultural activities not be carried out due to electrical safety considerations. The ESS 2 is applicable as there is involuntary permanent and temporary restrictions on land use for the tower footing as well as RoW of the Transmission line and compensation for restricted/temporary use of land, tree / crop/structure (if any) damages will be paid to the individual landowners as per compensation procedures laid in Ministry of Power, Government of India (MoP, GoI) guidelines for payment of compensation towards damages with regard to RoW, October 2015 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

ESS 3: Indigenous Peoples

The **ESS 3** - A total of seventy-eight (78) households belonging to the Scheduled Tribe (Plains) community are currently identified as affected by the Project. Additional ST households may be identified following the completion of the census survey within the RoW. The nature of impacts on these households is assessed as minor, temporary, and primarily economic, consisting mainly of crop loss and temporary restrictions on land use within the RoW. Although the Project area does not fall within a Sixth Schedule area under the Constitution of India, the presence of Boro (Bodo), Garo, and Karbi ST households is noted. These groups are recognized as distinct Indigenous communities, possessing their own languages, cultural traditions (including festivals such as Bwisagu), and customary social institutions (e.g., traditional village councils). Accordingly, they meet the defining characteristics of Indigenous Peoples as set out under AIIB Environmental and Social Framework (ESF) 2024 – ESS 3.

The term indigenous peoples are used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and
- A distinct language, often different from the official language of the country or region.

ESS 3 is applicable for the 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat transmission line project. The assessment is based on a mixed-method socio-economic survey for the tower footing locations, combined with a sampling approach for households within the Right of Way (RoW) corridor. The survey found that 78 households from the ST Plains community will be affected in Sonapur Transmission line. However, these affected households do not possess distinct cultural, linguistic, or institutional characteristics of Indigenous Peoples. Moreover, the area is not covered under the Sixth Schedule of the Indian Constitution. Hence, **ESS 3** is triggered.

Accordingly, the project impacts affecting the ST households will be addressed through inclusive environmental and social assessment, meaningful consultation, mitigation, and monitoring measures consistent with AIIB requirements and how while a separate Indigenous Peoples Plan (IPP) is not required, impacts on Scheduled Tribe households will be adequately managed under ESS 1 – Environmental and Social Assessment and Management and ESS 2 – Involuntary Resettlement, where land acquisition, livelihood impacts, or access restrictions occur. Compensation and assistance measures will be implemented in accordance with applicable national regulations and ESS 2 requirements, with particular attention to ensuring that Scheduled Tribe households are not disadvantaged in accessing project entitlements, grievance redress mechanisms, or livelihood restoration support.'

B. Environmental and Social Exclusion List

Projects that do not comply with the AIIB's ESP and ESSs will not be financed. The Bank will not knowingly finance a Project that: (a) either involves or results in forced evictions[3]; or (b) involves activities or items specified in the list set forth in the Environmental and Social Exclusion List of Environmental and Social Framework, February 2016 of AIIB.

C. Project Categorization

AIIB determines the project's category by the category of the Project's component presenting the highest environmental or social risk, including direct, indirect, cumulative and induced impacts, as relevant, in the project area. It assigns each proposed Project to one out of the 4 designated Categories i.e. Category A, Category B, Category C and Category F1.

Table 3.4: Project Categorization as per AIIB

S. No	Category	Requirement of Assessment
1	Category A	Project will be categorized as 'A' if it is likely to have significant adverse environmental and social impacts that are irreversible, cumulative, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works and may be temporary or permanent in nature. These types of projects require a detailed ESIA.
2	Category B	Project is categorized B when it has a limited number of potentially adverse environmental and social impacts; the impacts are not unprecedented; few if any of them are irreversible or cumulative; they are limited to the Project area; and can be successfully managed using good practice in an operational setting. Requirement of E&S Assessment or another similar instrument as appropriate to be determined by a prior initial review of the environmental and social implications of the Project. The scope of the assessment may vary from Project to Project, but it is narrower than that of the Category A ESIA.
3	Category C	A Project is categorized C when it is likely to have minimal or no adverse environmental and social impacts. Such projects do not require an environmental and social assessment but do require conducting a review of the environmental and social implications of the Project.
4	Category FI	A Project is categorized FI if the financing structure involves the provision of funds to or through a financial intermediary (FI) for the Project.

The Project has been assigned to **Category B,** as AEGCL is not siting the transmission line in sensitive areas.

3.4 Gap Analysis between National and AIIB Policies and Standards

[3] Forced eviction is defined as the permanent or temporary removal, against the will of individuals, families and/or communities, from homes or land (or both) which they occupy, without the provision of, or access to, appropriate forms of legal or other protection (such as the provisions of ESS 2: Involuntary Resettlement). The exercise of eminent domain, compulsory acquisition or similar powers, is not considered to be forced eviction, providing it complies with the requirements of national law and the provisions of ESS 2: Involuntary Resettlement, and is conducted in a manner consistent with basic principles of due process (including provision of adequate advance notice, meaningful opportunities to lodge grievances and appeal, and avoidance of the use of unnecessary, disproportionate or excessive force).

Following gaps has been identified:

- Power transmission projects are not listed as environmental sensitive projects under EIA notification 2006 and fall in B2 category does not require EIA. However, the ESS of AIIB lists power transmission projects as projects which may have adverse environmental and social impacts as category B project and requires ESIA -ESMP report.
- As per National Laws analysis of alternatives is not mandatory for power transmission line projects. However, as per AIIB guidelines, it is mandatory to analyse alternatives.
- As per the GoI and GoA guidelines ESMP development and budget allocation is not required. The same is required as per AIIB's guidelines.
- As per national regulations, power transmission line projects do not need public consultation. EIA notification does not cover the grievance redress mechanism but AIIB guidelines require public consultation and a mechanism to receive and facilitate resolution of grievances or complaints.
- As per Indian standards information disclosure is not mandatory for Power Transmission projects whereas the AIIB guideline requires information disclosure.
- There are no specific national guidelines on applicability of minimum environmental standards on power transmission line projects. However, IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission clearly sets minimum environmental limits on air, water, noise and soil quality, which should be followed.
- National Regulations do not cover all displaced persons, such as non-titled on government land. While AIIB mandates compensation for all affected people regardless of property title status.
- As per Indian Standards the power transmission projects do not require any monitoring and reporting whereas as per AIIB guidelines the project requires monitoring and reporting.

3.5 AEGCL's Environmental and Social Policy and Procedures

AEGCL has worked with MDBs, such as World Bank (WB) and Asian Development Bank (ADB). Under the previous projects, AEGCL developed its Environmental and Social Policy and Procedures (ESPP)[4] based on the principle of "Avoidance, minimization & Mitigation". As part of ADB funded projects, AEGCL gained experience in development and management of E&S instruments per MDBs' requirements.

AEGCL's working operation safety manual[5] also serves as its commitment towards fulfilling the E&S responsibilities including occupational health and safety.

[4]https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_MoUs/2015/6/ESPPF_ASSAM.pdf

[5] https://www.aegcl.co.in/Safety_Manual_AEGCL.pdf

4 Description of the Environment

This chapter describes the Baseline Environmental features in detail. It includes details about location characteristics, study area, physical environment, biological environment (flora and fauna) and socio-economic environment baseline of the study area.

4.1 Location Characteristics

The project site is located at Sonapur Tehsil in Kamrup (Metro) district of Assam. The project footprint (RoW) is spread across following villages in the transmission line namely:

A. 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line: Villages namely: Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar.

No national park, wildlife sanctuaries, biosphere reserves, notified historical and cultural sites etc. are falling in the entire Right of Way (RoW) of the transmission line. However, 13 numbers of tower locations is falling in the West Aprikola Reserved Forest. Accordingly, the *In-Principle Approval (Stage-I Forest Clearance)* of the Central Government has been granted for the diversion of 14.28 hectares of forest land for the construction of the 400 kV S/C LILO Silchar–Byrnihat transmission line within the West Aprikola Reserved Forest (Appendix-16) under Kamrup East Division, Basistha, in favour of AEGCL.

The location of transmission line on Survey of India toposheet with surrounding environmental and social features are already given in Figure 2.1 and Figure 2.2.

4.2 Study Area

The direct impacts of the project are confined to the Right of Way (RoW) which is designated as 46 m for the 400 kV Transmission Line. Indirect or induced impacts extends to the Area of Influence (AoI) defined by a buffer zone of 2 Km on either side of the transmission line considered for environmental & social baseline assessment and a 10 Km radius for evaluating the impact on flora & fauna of the area. **Figure 4.1** shows the study area map for baseline study.

4.2.1 Project foot print Area

All permanent / temporary land required for following activities comes under the Project Footprint:

- The erection of 68 numbers of transmission towers for the LILO line;
- Stringing of conductors across the transmission line of 19.500 km length from temporary tapping point to substation (RoW of 46 m);
- Temporary access through government and private land for construction and maintenance works in operation phase;
- Temporary use of vacant government land for storage of materials and equipment nearby the location of construction;
- Temporary set up (for 25-35 days) of Labour accommodation arrangement nearby the location of construction.

4.2.2 Project Area of Influence (AOI)

Project's Area of Influence (AoI) is considered the area where potential indirect and induced impacts of the Project and Project activities are anticipated.

The AOI of project is considered within a corridor of 2 Kms either side of the transmission line with respect to the environmental and social features based on the following impacts:

- In normal conditions dust emissions–typically up to 100 m from major construction areas and up to 500 m during windy summer conditions;
- Noise impact area –typically 100-200 m from construction site;
- The impacts on soil and land- typically up to 50 -70 m from project foot print area;
- Apart from the direct impacts of acquiring rights of use / RoW for tower bases and land-use restrictions in transmission corridor for the habitats - within a corridor of 2 km either side.

4.2.3 Project Area of Influence (AOI) – Biodiversity

- Terrestrial and Aquatic Flora & Fauna: (a) the direct footprint of the project; (b) The areas immediately adjacent to the project footprint within which a zone of ecological disturbance is created through increased dust, human presence and project related activities: - Within 2 km of the project footprint;
- Migration of fauna (especially avifauna) – Considered 10 km buffer on either side from centre line of transmission line.

Study area map (RoW, 2 km and 10 km buffer is given below.

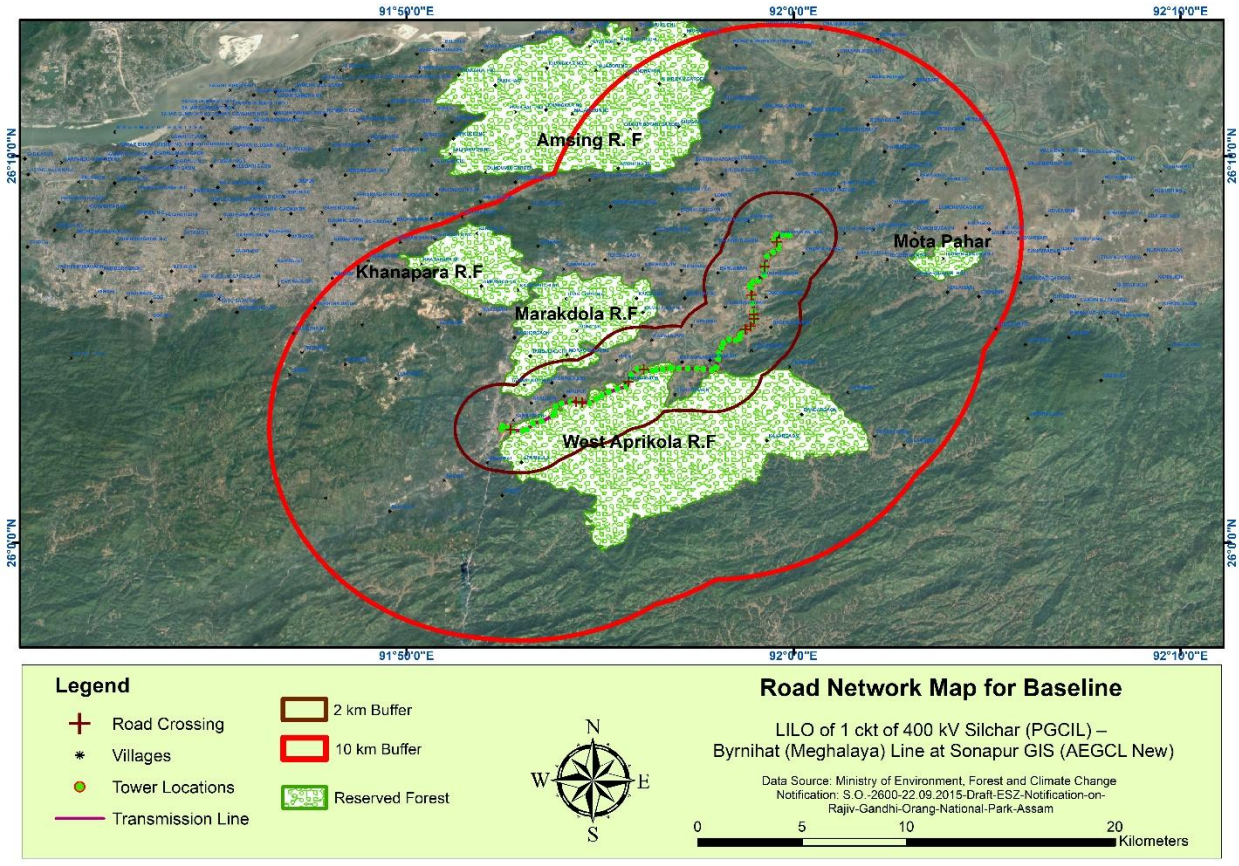


Figure 4.1: Study area map (RoW, 2 km and 10 km buffer) of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.2.4. Methodology of baseline data collection/surveys carried out

The studies were conducted by considering the following:

The various environmental and social attributes were divided into primary and secondary studies. Primary attributes such as air environment, water, soil, noise, flora and fauna, and consultation were assessed and conducted by field studies, on-site monitoring and review of the past studies conducted.

Secondary attributes such as land use studies, geology, physiological characteristics, and socio-economic profile have been assessed by literature review of previous studies conducted by various government publications.

An interdisciplinary team through discussions and professional judgment formulated the scoping and the extent of data generation. The baseline studies started with site visits and reconnaissance survey in the study area. As a secondary data review, various Government agencies information and relevant data of the study area were collected.

Overall, environmental information is based on primary data generated through field survey and also on secondary information from published sources. The primary data have been obtained from environmental monitoring of ambient air quality, ground water quality, soil quality and noise level conducted at Sonapur S/s. Secondary data / information has been collected from reliable sources like District Disaster Management Report, Central Ground Water Board, District Survey Report and Census Data of Assam (2011) for geology, hydrology, land use, meteorology, ecology and socio-economics.

Brief ecological surveys were carried out. Data of flora and fauna has been gathered from secondary sources, including IBA/KBA sites, AVISTEP etc. whereas tree enumeration data were gathered from detail route survey report of transmission line.

As part of the Critical Habitat Assessment, Key Biodiversity Areas (KBA) & Important Bird & biodiversity areas (IBA) were identified by obtaining data from The World Database of Key Biodiversity Areas. This data was then overlaid with the route of the proposed transmission line to determine whether any KBA sites fall within or near the vicinity of the transmission line route.

4.3 Biological Environment- Flora and Fauna

4.3.1 Floral Assessment

The project area primarily comprises of agricultural land, crop plantation, water bodies etc. The vegetation associated with these habitats is described below.

Agricultural Field

The staple food of the people in the study region is rice and wheat. Agro-climatic conditions of the area provide a range of potentialities for growing cash crop like off seasonal vegetable i.e. onion, chilly, brinjal, bhindi, fruits and flowers. Kitchen gardening is also common because of sufficient available space in and around house. The commercial cultivation of tea (*Camellia sinensis*) is also found in some pockets of the study area.

Main agricultural crop production in project area is paddy (*Oriza sativa*). The common rabbi crops grown in the study area are maize, gram, mustard, turmeric, potato, carrot, pea etc. whereas rice, jowar, arhar, tur, moong, til, groundnut, soyabean, chilly, ginger, etc. are kharif crops. Other than cereals, fruits like mango, pineapple, orange, jackfruit, banana, litchi, lemon, papaya, guava etc. are also grown in the study area.

Homestead Plantation

Homestead plantations mostly comprise of *Dipterocarpus macrocarpus, Azadiracta indica, Aegle marmelos, Albizia procera, Butea monosperma, Cassia fistula, Tectona grandis, Ficus religiosa, Carica papaya, Mangifera indica, Tamarindus indica, Eucalyptus tereticornis, Areca catechu* etc.

Trees within the transmission line corridor

As per the detailed survey report, the Right of Way of " 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line" involves the felling of approximately **546 trees** within forest areas, for which the necessary permissions have been obtained, and about **6,566 trees** - comprising both fruit-bearing and non-fruit-bearing species - outside the forest area. In addition, approximately **4,938 bamboo plants** are present within the RoW corridor.

For trees within forest area (14.28 Ha) the required amounts towards Net Present Value (NPV), Cost of Compensatory Afforestation, and Overhead Charges, have been deposited through the online portal into the CAMPA account, amounting to **₹5,34,75,093.00.**

The actual number of project-affected trees will be updated during the execution phase, based on a joint tree enumeration and compensation assessment carried out by AEGCL, PMC, and the Local Revenue Authority. Detailed tree enumeration is provided in **Appendix-13.**

4.3.2 Faunal Assessment

The faunal assessment of the project area reveals presence of common domesticated fauna like Cow, buffalo, goat, pig, dog etc. with common wild species like fox and monkeys are also reported. Also, common species of birds and other mammals are found.

Faunal Diversity of Amchang WLS/KBA: The faunal species found in Amchang Wildlife Sanctuary/KBA are Hoolock Gibbon (Hylobates hoolock), Slow Loris (Nycticebus coucang), Capped Langur (Trachypithecus pileatus), Rhesus Macaque (Macaca mulatta) and the Assamese Macaque (M. assamensis). Other mammals include the Asian Elephant, Tiger (Panthera tigris), Leopard (P. pardus), Leopard Cat (Prionailarus bengalensis), Jungle Cat (Felis chaus), Gaur, Sambar (Cervus unicolor) and Barking Deer (Muntiacus muntjak) etc.

Avifauna Assessment

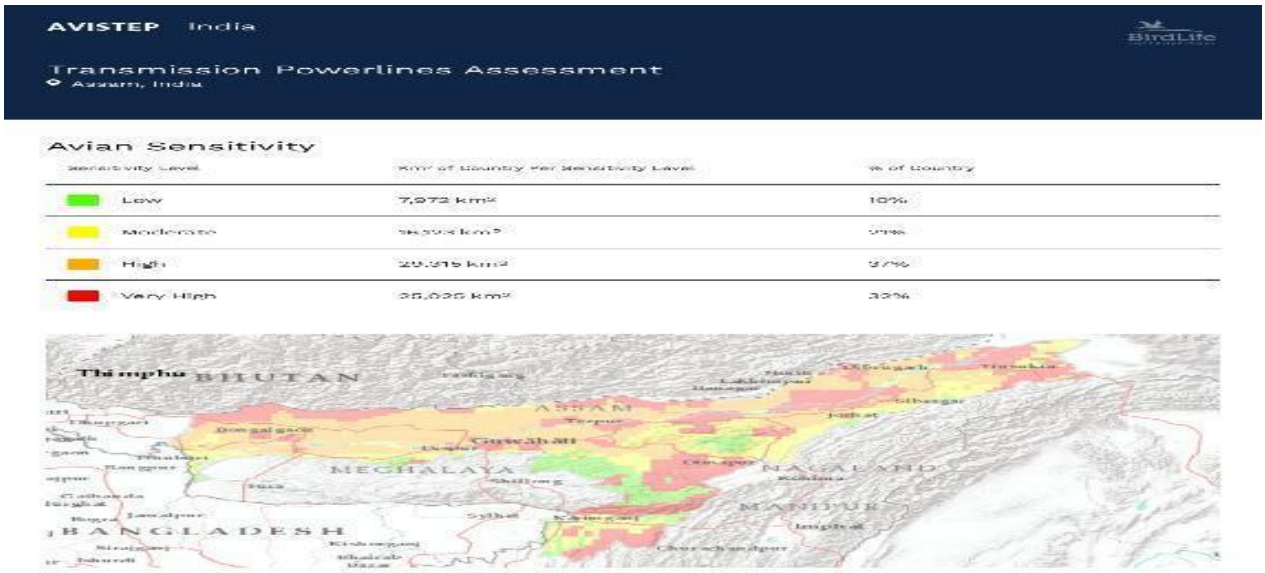
The details of avifaunal species of project area are Lesser Adjutant (Leptoptilos javanicus), Greater Adjutant (Leptoptilos dubius), Whitebacked Vulture (Gyps bengalensis), Slender-billed Vulture (G. tenuirostris), Kaleej Pheasant (Lophura leucomelanos), Green Imperial Pigeon (Ducula aenea), Wreathed Hornbill (Aceros undulatus), Great Pied Hornbill (Buceros bicornis) etc.

List of bird species as mentioned in Appendix-9 are Greater Adjutant, Lesser Adjutant, Black necked Stork, Baer's Pochard, Wood Snipe, Spot-billed Pelican,White cheeked Partridge, Black-tailed Godwit, White-rumped Vulture, Indian Peafowl, Oriental Darter, Black-headed Ibis, Alaxandrine Parakeet, Little Ringed plover, Indian Spotted Eagle, Red Breasted Parakeet, Falcated Duck, etc. A statement on AVISTEP analysis and detail list of birds have been provided in appendix-9.

The AVISTEP sensitivity map of Assam is depicted in Figure 4.2.A.

In the context of the proposed LILO transmission line, the AVISTEP analysis results are presented in Figures 4.2.B, which indicate a range of moderate to High level of avian sensitivity for the respective areas. Consequently, appropriate mitigation measures, such as the installation of bird guards and bird diverters will be implemented as part of the project design to minimize potential impacts on avian species.

The nearest Important Bird Area (IBA) site form the project area is Amchang wildlife Sanctuary. As per site assessment, it reveals presence of common bird species like crow, dove, crane, water dwelling birds, etc. are prevalent in the project area. Although the occurrence of CR/EN/VU avifauna species in the project area is assessed to be minimal but the possibility of their occasional presence cannot be entirely ruled out in the project area and hence necessary mitigation measures have been provided.



Source: Environmental and Social team

Figure 4.2 A: AVISTEP map of Assam



Source: AVISTEP

Figure 4.2.B: AVISTEP map project area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.3.3 Critical habitats and IBA in the Project area

The RoW corridor of all the LILO line does not involve any IBA or critical habitats of Endangered/Vulnerable species as per the assessment of Key Biodiversity Areas (KBA) in and around the project area. For Sonapur transmission line, from the analysis of World Database of Key Biodiversity Areas, it is revealed that the nearest KBA Site (Amchang Wildlife Sanctuary) is at an offset of appx. 800 meters from the transmission line. During consultations with the Forest Range Officer, Sonapur on 16th December, 2025, it was confirmed that the proposed transmission line does not pass through or affect any critically designated wildlife habitats within the West Aprikola Reserved Forest area. However, the presence of common wildlife species such as monkeys and foxes was reported. Further consultations were conducted with local residents living near the Reserved Forest between AP 3–5 and AP 24–27 on 16th December, 2025. The residents reported that, since they began residing in the villages, no wild animals have been observed in the area except for foxes. A map showing the project area vis-a-vis location of Critical Wildlife Habitats (KBA sites) and IBA is shown in **Figure 4.3.**



Figure 4.3: IBA & Critical habitat (KBA site) vis-a-vis transmission line route of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.3.4 Migratory Routes

Migratory birds use loosely fixed routes for their migration. Globally, certain routes have been identified that connect both the northern and southern hemispheres. Every year, millions of water birds follow these routes to reach their destinations and return journeys.

Usually, migratory birds follow a north-south axis to spend the duration of their non-breeding winter season. The figure below indicates that there are no bird migratory routes passing through the project area.

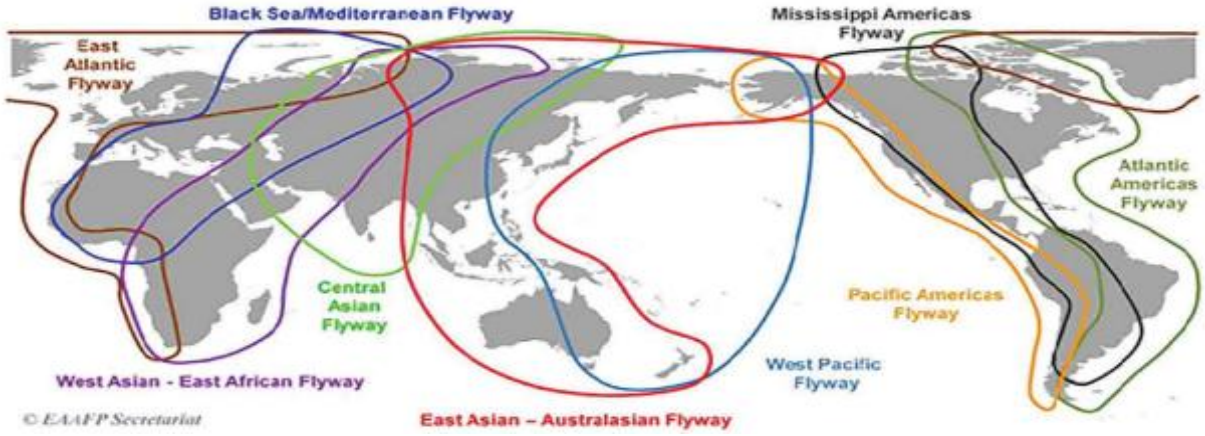


Figure 4.4: The map of the world is showing the migratory birds flyways.

(Image Source: East Asian-Australasian Flyway Partnership (EAAFP); https://www.eaaflyway.net/the-flyway/)

4.4 Physical Environment Baseline of the Study Area

4.4.1 Land use and Land cover

In the study area, the land is primarily used for agriculture / crops. The other land uses in the area are built up residential areas and water bodies. The land use map of the study area is presented in **Figure 4.5**. The details of the land use of transmission tower base and RoW of transmission line is provided in **Table 2.4.**

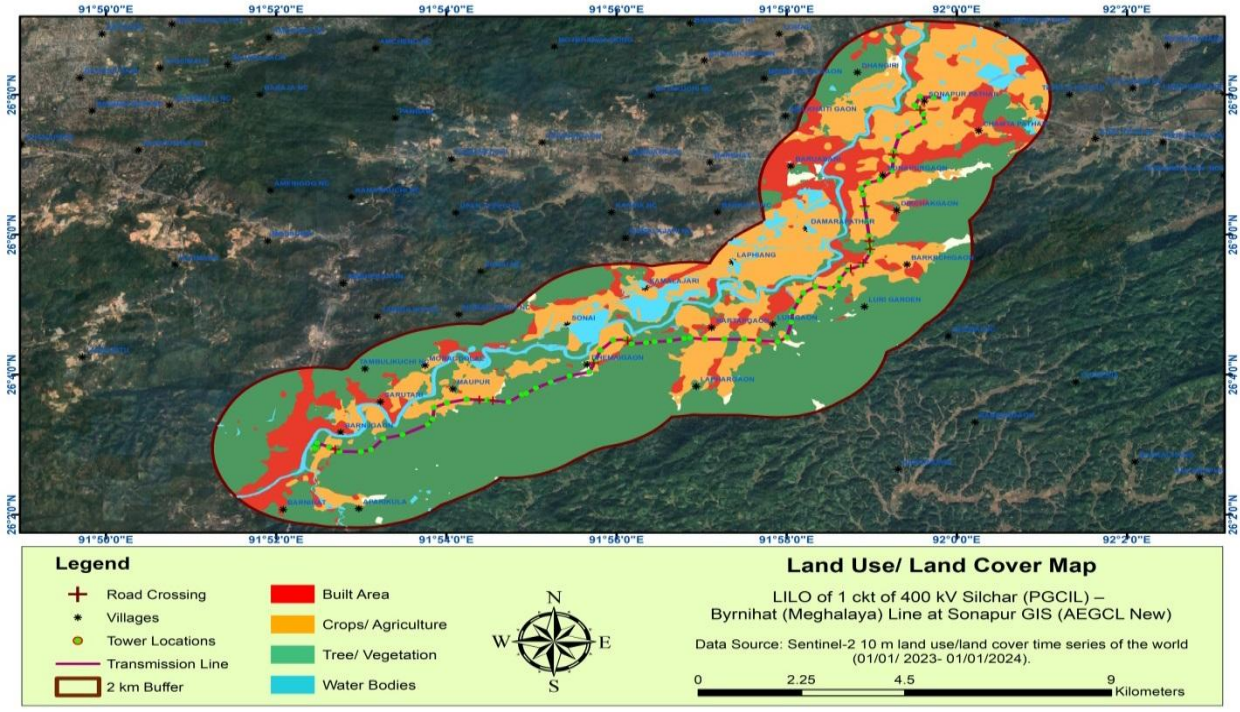


Figure 4.5: Land use and Land cover of study area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.4.2 Topography

Assam is situated in the North-East of India and is the largest north-eastern state in terms of population while second in terms of area. Assam covers an area of 78,438 km2 (30,285 sq miles). The state is bordered

by Bhutan and the state of Arunachal Pradesh to the north; Nagaland, Arunachal Pradesh and Manipur to the east; Meghalaya, Tripura, Mizoram, and Bangladesh to the south; and West Bengal to the west. A significant geographical aspect of Assam is that it contains three of six physiographic divisions of India – The Northern Himalayas (Eastern Hills), The Northern Plains (Brahmaputra plain), and the Deccan Plateau (Karbi Anglong).

The Kamrup (Metro) district is situated in the western part of the state, surrounded by Darrang and Morigaon district on the east, Nalbari and Goalpara on the west, Baksa on the North and Meghalaya state on the west. The mighty river Brahmaputra bifurcates the district into nearly equal parts. The river thus has a lot of influence in the physiography of the entire district. In the immediate neighborhood of the Brahmaputra the land is low, and exposed to annual inundation. In this marshy tract reeds and canes flourish luxuriantly, and the only cultivation is that of rice. At a comparatively short distance from the river banks the ground begins to rise in undulating knolls towards the mountains of Bhutan on the north, and towards the Khasi hills on the south. The hills south of the Brahmaputra in some parts reach the height of 800 feet (240 m).

A mix of plain and undulating topography has been found in the study area of transmission line. Elevation of project corridor of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line is 41 to 150 meters in Kamrup (Metro) district above the sea level. The DEM map of the study area is presented in **Figure 4.6.**

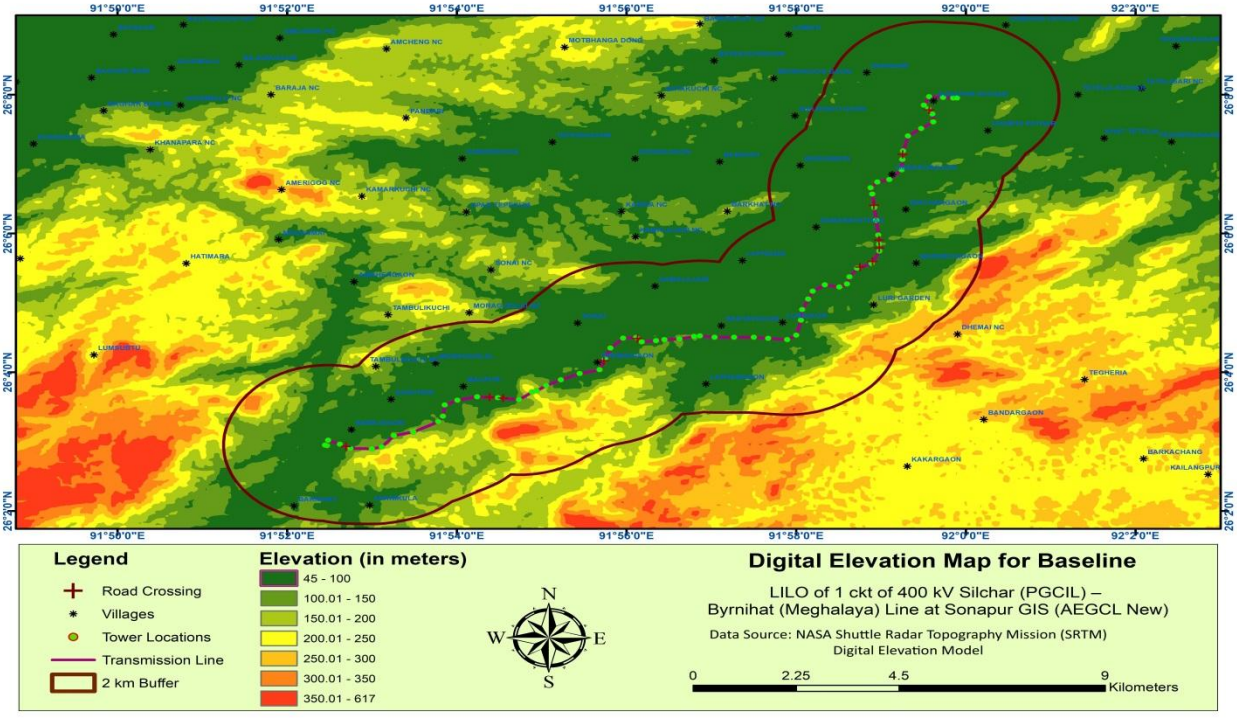


Figure 4.6: DEM map of the study area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.4.3 Drainage

The Brahmaputra is the main river, which passes through the district. There are a number of tributaries of the Brahmaputra, which are the major natural water resources. The northern tributaries viz., Bornadi, Puthimari, Sessanoi, Borolia etc. originating from Bhutan hills subsequently flow southwards into

Brahmaputra. The southern tributaries viz., Kulsi, Kukurmara, Boko and Singra originating from Meghalaya hills subsequently flow northwards into the Brahmaputra. Most of these rivers carry huge volumes of water during monsoon and overflow due to heavy rainfall during the monsoon season causing flood hazard in the district every year. There are number of small streams, channels and sizeable area under marshy lands in the district of Kamrup.

Drainage map of the study area is given **Figure 4.7.**

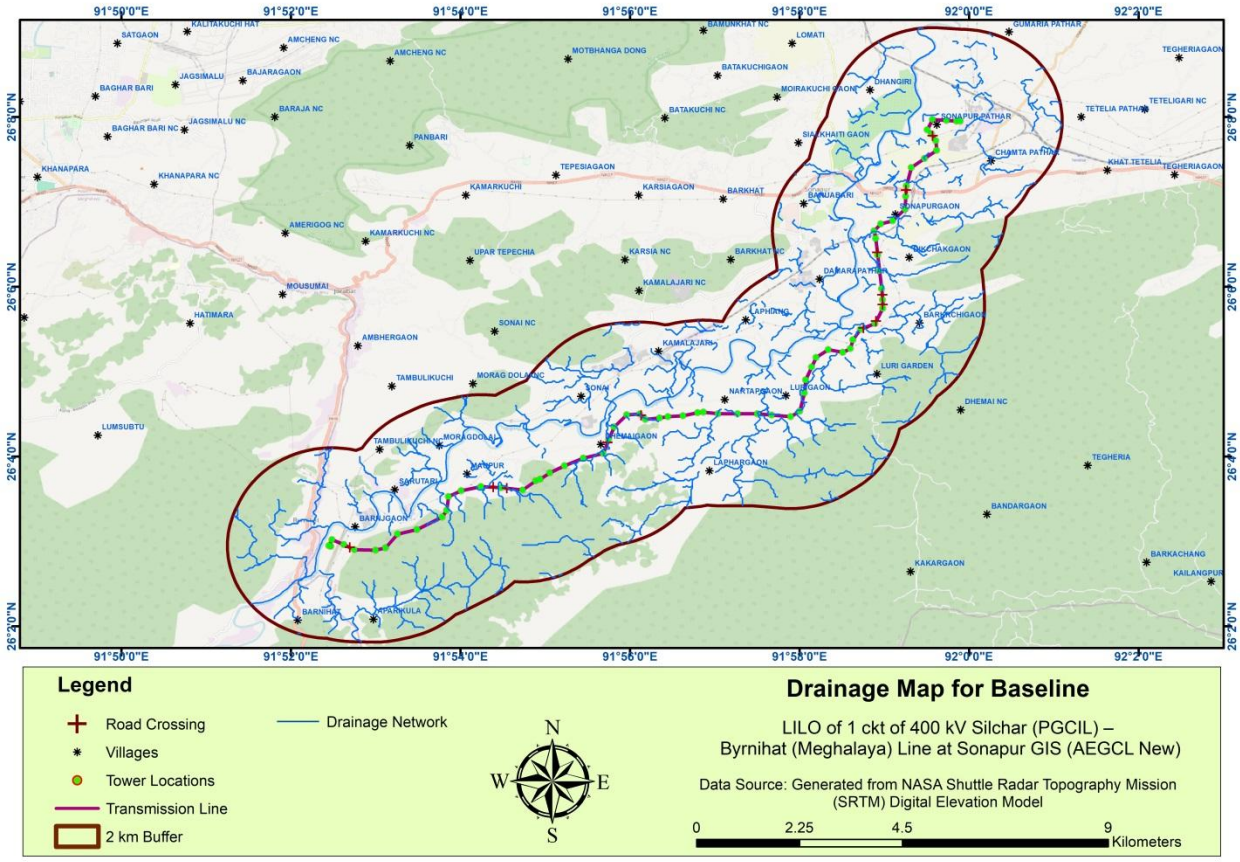


Figure 4.7: Drainage map of the study area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

4.4.4 Geology & Soil Characteristics

The area consists of two broad hydrogeological units – 1) Pre-Cambrian consolidated rocks and 2) Quaternary alluvium consisting of unconsolidated sediments. Pre-Cambrian consolidated rocks are confined to hilly areas and inselbergs. The oldest formation is composed of Gneisses and schist, which are extensively intruded by granites occurring as small basses. Later pegmatite and quartz veins intruded both. The Kamrup (Metro) district has a more or less plain topography, some hillocks are found here and there. It has a gentle slope from northern side towards south direction.

The major groups of soils identified in the district are recent riverine alluvial soils (Entisols), old riverine alluvial soils (Inceptisols), mountain valley alluvial soils (Ultrasols) and laterite red soils (ultisols). The flood plain of Brahmaputra is built up with riverine alluvial soils. The valleys soils are characterized sandy loam to clay, which are not affected by the flood. The northern part of the district lying at the foothills of Bhutan is

built up of old mountain valley alluvial soils, which are heavy textured soils. In the laterite red soils, iron and aluminum are found along the southern hilly tracts of the district. These are fairly well drained coarse textured soils. The district usually faces heavy losses in agricultural production due to recurring occurrence of flood. It not only causes damage to the standing crops but also to the soil due to long duration inundation and deposition of sand particles over a large area in varying depth.

4.4.5 Climate Characteristics

Normal climate profile for the whole state of Assam is humid sub-tropical climate zone. The seasons experienced by the area is described below:

- Pre-monsoon: March-May
- Monsoon: June – September
- Post-monsoon: October- November
- Winter: December- February

As per the report of CGWB (2022-23), the climate of the Kamrup (Metro) district is predominantly sub-tropical humid climate with heavy rainfall, hot summer and high humidity. Average temperature ranges from 12 to 38°C during the year. In winter, temperature ranges from 15 to 25°C during day and 8 to 15°C during night. The summer temperature ranges from 25 to 38°C during day and 15 to 25°C during night. Monsoon usually starts from April and continue till end of September. Prevalence of Relative Humidity is generally high (78-80%) particularly during the summer months. Winter months are cool and start from November to February.

The average annual rainfall recorded from 2011 to 2020 of I.M.D is 1749.46 mm. Rainfall during January to April contributes nearly 16.61% to the total rainfall whereas the rainy season which commences from May and continues up to September contributes 79.18%. October to December rainfall is 4.1%. December receives least rainfall and maximum rainfall occurs during May and June.

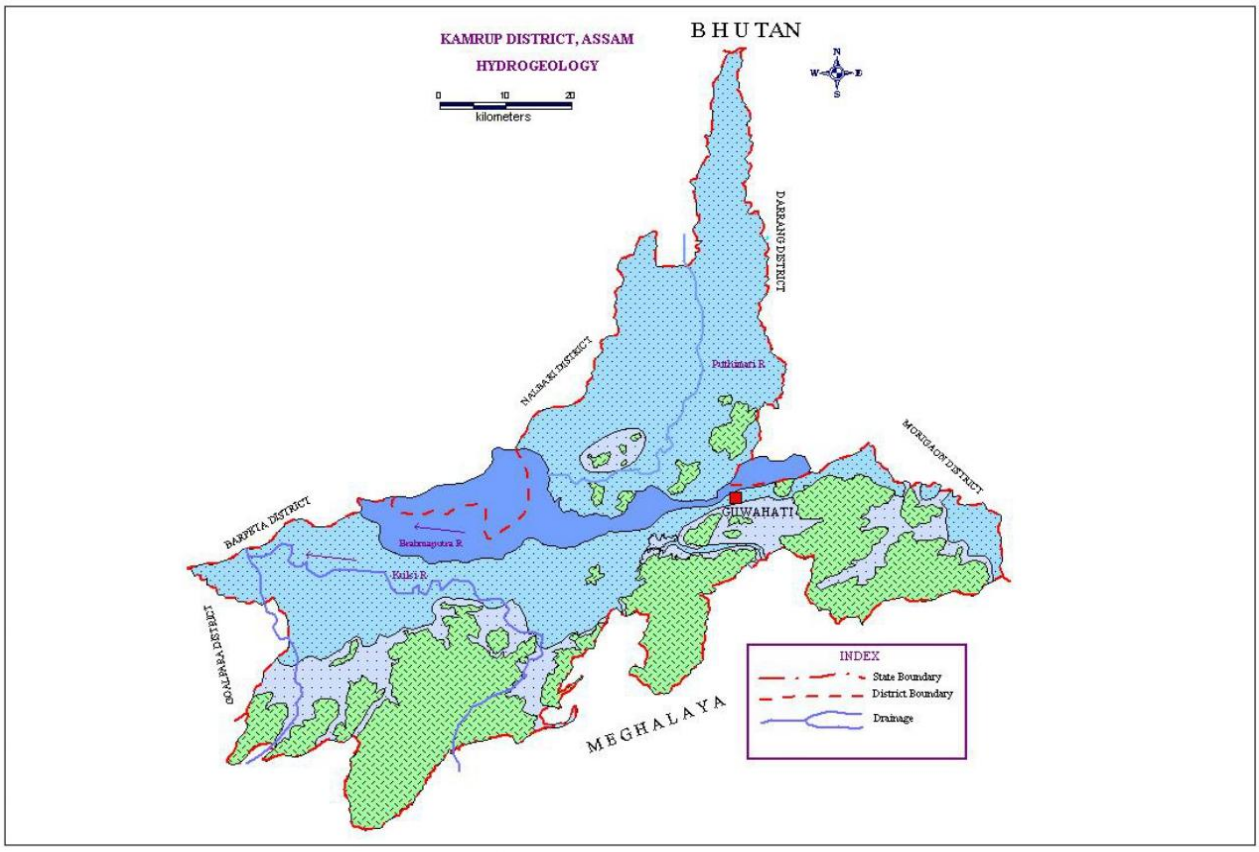
4.4.6 Ground Water Characteristics

The Kamrup (Metro) consists of two broad hydrogeological units – 1) Pre-Cambrian consolidated rocks and 2) Quaternary alluvium consisting of unconsolidated sediments. Pre-Cambrian consolidated rocks are confined to hilly areas and inselbergs, where ground water occurs in shallow weathered zone and this can be developed through open wells. The joints and fractures developed due to tectonic activities form potential water bearing zones and suitable for development through construction of bore wells.

In the alluvial plain, groundwater occurs in regionally extensive aquifers down to the depth of 305 m. It has a very good yield prospect. The aquifers are consisting of sands of various grades with gravel and are suitable for construction of both shallow and deep tube wells. Groundwater occurs under unconfined to semiconfined condition occupying an area of about 200 sq. km. in and around Baihata – Dumunichowki which is under artesian condition. In other parts also, the water level rests at shallow depth and in major part, it rests between 2 – 5 m bgl during pre-monsoon period. The study of long term water level trend shows no significant change in rise/fall in water level in the last 10 years.

The shallow tube wells tapping aquifers within 50 m depth are capable of yielding about 10 lps in major places, deep tube wells constructed within 95 m depth tapping about 30 m granular zones are yielding 10 – 20 lpm. The transmissivity of the aquifer ranges from 41 to 6162 m^2 /day and the permeability varies from 10 to 59 m/day. In hard rock, the yield of bore well-constructed in greater Guwahati area ranges from 4 to 300 lpm.

Hydrogeological map of Kamrup (Metro) district are given in **Figure 4.8.**



Source: Central Ground Water Board

Figure 4.8: Hydrogeological map of Kamrup (Metro) district

4.4.7 Ambient Air Quality

The ambient air quality monitoring conducted at Sonapur S/s is given below

Table 4.1: Ambient air quality monitoring results of Sonapur S/s

Pollutant	Time Weighted Average	Concentration in Ambient air (mg/m^3), NAAQS, MoEF&CC 2009		WHO AQGs 2021	Results (Baseline data) (Dated-11.01.2025)	Results (Data generated for post- monsoon season 2025) (Dated-31.10.2025)
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas			
Particulate Matter: PM10 (<10 µm)	Annual 24 hr	60 100	60 100	15 45	92	64
Particulate Matter: PM2.5 (<2.5 µm)	Annual 24 hr	40 60	40 60	5 15	54	27

The air quality/PM baseline measurements are within the standards of NAAQS, MoEF&CC but exceed the WHO AQGs. The test results are provided in Appendix-8.

4.4.8 Ambient Noise Level

The ambient noise level monitoring conducted in Sonapur S/s is given below.

Table 4.2: Ambient noise level monitoring results of Sonapur S/s

Area Code	Category	Sound Parameters (dBA)				Results (Baseline data) (Dated- 11.01.2025)		Results (Data generated for post-monsoon season 2025) (Dated-31.10.2025)	
		CPCB Ambient Noise Standards [Limit in dB (A) Leq])		WBG Noise Standards					
		Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
A	**Industrial**	**75**	**70**	**70**	**70**	58.6	48.8	60.8	48.4
B	Commercial	65	55	70	70				
C	Residential	55	45	55	45				
D	Silence Zones	50	40	55	45				

The ambient noise level of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.4.9 Surface and Ground Water Quality

The Water Quality monitoring conducted in Sonapur S/s is given below.

Table 4.3: Water Quality monitoring results of Sonapur S/s

Parameters	Results (Baseline data) (Dated-11.01.2025)	IS-10500-2012 Requirement Acceptable Limit)	IS-10500-2012 Permissible Limit in the absence of alternate source	Results (Data generated for post-monsoon season 2025) (Dated-31.10.2025)	Requirement Acceptable Limit	Permissible Limit in the absence of alternate source
pH	6.57	6.5-8.5	No relaxation	6.51	6.5-8.5	No relaxation
Conductivity	0.163	---	---	0.118	---	---
Colour	1	5	15	1	5	15
Total Dissolved Solids	56	500	2000	59	500	2000
Total Suspended solids	200	---	---	<10	---	---
Turbidity	0.1	1	5	1	1	5
Dissolved Oxygen	6.8	---	---	3.1	---	---
Chlorides	37.08	250	1000	<2	250	1000
Fluoride	BDL	1	1.5	<0.5	1	1.5
Iron	0.21	0.3	No relaxation	0.20	0.3	No relaxation
Oil and Grease	Nil	---	---	<2	---	---
Sulphates	12.1	200	400	<2	200	400
Hardness	61.3	200	600	34	200	600
Nitrate	0.58	45	No relaxation	<5	45	No relaxation
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
E.Coli	Absent	Absent	Absent	Absent	Absent	Absent
Total Coliform	Absent	Absent	Absent	Absent	Absent	Absent

Parameters	Results (Baseline data) (Dated- 11.01.2025)	IS-10500-2012 Requirement Acceptable Limit)	IS-10500-2012 Permissible Limit in the absence of alternate source	Results (Data generated for post-monsoon season 2025) (Dated- 31.10.2025)	Requirement Acceptable Limit	Permissible Limit in the absence of alternate source
BOD	---	---	---	<2	---	---
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Floating Materials	---	---	---	Not Visible	---	---

The water quality of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.4.10. Soil Quality

The Soil Quality monitoring conducted in Sonapur S/*s* is given below.

Table 4.4: The Soil Quality monitoring results of Sonapur S/s

Parameters	Results (Baseline data) (Dated- 11.01.2025)	Results (Data generated for post- monsoon season 2025) (Dated- 31.10.2025)	CPCB Soil Standards
pH value (1.5)	4.88	6.44	6-7.5 (ISO: 10390)
Sulphite in SO_3 in %	12.4	14.6	---
Chloride in mg/kg	12.3	12.8	< 100 mg/kg (ISO: 10304-1)
ORP in mV	405	465	---
Water soluble salts as EC in mS/m	157	0.089	400 mS/m (ISO: 11265)
Organic matter in %	2.1	26.4	2–10%
Moisture Content in %	18.6	1.5	• Sandy: 5–10%, • Clayey: up to 30% or more.

The soil quality of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.4.11 Sensitive Receptors

There are 9 places of worship, 9 Schools, 2 Public health centers, 1 community hall, 1 Forest office, 1 Cemetery, 1 Panchayat office and 1 Library coming within a radius of 500 m from the proposed 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line. Details of sensitive receptors within 500 m from the centerline of the TL against the tower are given in table below.

Table 4.5: Details of sensitive receptors within 500 m from the centerline of the TL

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line- 19.500 km					

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
1.	AP-12	91°54'14.50"E 26° 3'38.80"N	Moupur L P School (91°54'6.42"E 26°3'53.21"N)- Left Hand Side (LHS) from CL	493	
			Moupur Library (91°54'13.04"E 26°3'52.57"N)- Left Hand Side (LHS) from CL	427	
2.	20/1	91°55'44.82"E 26° 4'11.61"N	Dhemai LP School (91°55'52.29"E 26°4'12.75"N)- Right Hand Side (RHS) from CL	182	
3.	AP-21	91°55'48.65"E 26° 4'20.92"N			
4.	AP-29	91°56'52.00"E 26° 4'31.47"N	Nartap ME School (91°56'54.70"E 26°4'41.21"N)- Left Hand Side (LHS) from CL	302	
5.	AP-30	91°57'2.35"E 26° 4'30.28"N	Nartap High School (91°56'57.45"E 26°4'41.84"N)- Left Hand Side (LHS) from CL	340	
			Nartap MPHC, Hospital (91°56'59.70"E 26°4'41.12"N)- Left Hand Side (LHS) from CL	323	

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
6.	30/1	91°57'16.17"E 26° 4'30.26"N	Gora Goan Dehal Than (91°57'25.06"E 26°4'24.89"N)- Right Hand Side (RHS) from CL	166	
7.	AP-31	91°57'30.14"E 26° 4'30.24"N			
8.	AP-34	91°58'3.38"E 26° 4'45.05"N	Bhum Gaon Dehal Than (91°57'46.46"E 26°4'48.39"N)- Left Hand Side (LHS) from CL	480	
9.	AP-35	91°58'4.27"E 26° 4'54.22"N	Nartap Gaon Panchayat (91°57'57.24"E 26°4'55.80"N)- Left Hand Side (LHS) from CL	200	
10.	AP-36	91°58'11.80"E 26° 5'10.08"N	Netaji Subhash Chandra Bose Avasiya Vidyalaya (91°58'1.49"E 26°5'14.63"N)- Left Hand Side (LHS) from CL	280	
11.	AP-38	91°58'30.59"E 26° 5'13.73"N	Bhakuagog Baptist Church (91°58'42.13"E 26°5'8.04"N)- Right Hand Side (RHS) from CL	316	
12.	AP-39	91°58'35.92"E 26° 5'16.42"N			
13.	AP-43	91°58'58.90"E 26°5'44.76"N	Borkuchi Sub Centre (Hospital) (91°59'6.16"E 26°5'36.47"N) - Right Hand Side (RHS) from CL	264	

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
14.	AP-44	91°58'58.79"E 26°5'50.84"N	Alenga L.P. School (91°58'42.93"E 26°5'53.60"N)- Left Hand Side (LHS) from CL	398	
15.	45/1	91°58'56.58"E 26°6'11.29"N	Alenga Jyan Bikash Jatiya Vidyalaya (91°58'46.30"E 26°6'4.42"N)- Left Hand Side (LHS) from CL	305	
16.	AP-46	91°58'55.25"E 26°6'22.46"N	Jogukuchi Shiva Temple (91°59'0.42"E 26°6'24.57"N) - Right Hand Side (RHS) from CL	146	
17.	AP-47	91°58'53.93"E 26°6'34.14"N	Jogukuchi Gopal Mandir (91°59'12.94"E 26°6'23.40"N) - Right Hand Side (RHS) from CL	491	
			Padmaram LP School (91°58'43.76"E 26°6'26.14"N) - Left Hand Side (LHS) from CL	299	
18.	AP-48	91°58'52.68"E 26°6'39.48"N	Hatkhula Jame Masjid (91°58'41.70"E 26°6'43.01"N)- Left Hand Side (LHS) from CL	323	

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
19.	AP-49	91°58'57.47"E 26°6'44.47"N	Kali Maa Mandir (91°58'44.40"E 26°6'44.87"N)- Left Hand Side (LHS) from CL	288	
20.	AP-51	91°59'14.57"E 26°6'54.94"	Kapalkata panjkhana mosjid (91°59'19.79"E 26°6'55.17"N)- Right Hand Side (RHS) from CL	145	
			Kapalkata Cemetery (91°59'29.22"E 26°6'57.01"N)- Right Hand Side (RHS) from CL	409	
21.	AP-52	91°59'15.10"E 26°7'3.91"N	Mohmara Rajohua Namghar (91°59'8.72"E 26°6'59.42"N)- Left Hand Side (LHS) from CL	169	
			Mohmara Bikolango School (91°59'3.99"E 26°7'2.87"N) - Left Hand Side (LHS) from CL	309	
22.	AP-53	91°59'15.62"E 26°7'11.44"N	Kapalkata Navajyoti Sangha (91°59'25.82"E 26°7'5.43"N) - Right Hand Side (RHS) from CL	294	

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
			Forest Office, Sonapur Range (91°59'2.92"E 26°7'7.15"N) - Left Hand Side (LHS) from CL	344	

Source: Environment and Social Team

4.5 Social Environment Baseline of the Study Area

4.5.1 State Profile: Assam

As per the Census 2011, the total population of Assam is 3.12 Cr. Thus, the population of Assam forms 2.58 percent of India in 2011. Assam has total population of 31,205,576 in which males were 15,939,443 while females were 15,266,133.

The total area of Assam is 78,438 square km. Thus, the population Density of Assam is 398 per square km which is higher than the national average of 382 per square km.

Table 4.7: Assam Demographic Profile

Attribute	Number	% of India
Area (sq. km)	78,438	9.37
Total population	31,205,576	6.0
Males	15,939,443	6.03
Females	15,266,133	5.97
Sex ratio	958	NA
Percentage of rural Population	86	NA
Percentage of urban population	14	NA
Population density	398	NA
Percentage of SC population	7.15	NA
Percentage of ST population	12.4	NA
Total literacy rate	72.19	NA
Male Literacy rate	77.85	NA
Female Literacy Rate	66.27	NA
Rural Literacy	69.34	NA

Source: Census of India, 2011 data

Demography & Socio-Economic Condition

The literacy rate of Assam is nearly 72 % (of which the rural literacy stands at 69.34%) which lower is slightly than that of the country, at 74.04%. The male literacy rate is relatively higher, at 77.85% while the female literacy rate is 66.27% which is slight high when compared to the national female literacy rate of 65.46%.

According to the census of India, life expectancy in Assam has changed from 57.8 years of Males and 58.3 years of females in 2001 to 62.7 and 65.5 years in 2011 for males and females respectively.

Assam is categorized as a low HIV Prevalence state with an estimated adult HIV Prevalence of 0.07% which is lower than the National Prevalence of 0.27%. However, the adult HIV Prevalence in the state has increased from 0.04% in 2007 to 0.07% in 2011. In 2011, Assam had 1,48,124 Sub Centers, 23,887 Primary Health Centers, and 4,809 Community Health Centers, along with 7,347 hospitals in rural areas and 4,146 in urban areas.

In 2011, Assam had 48,050 elementary schools, with a significant increase from 41,579 in 2000-01. The Ministry of Education's data for 2011-12 categorized schools based on highest class level, including Senior Secondary, Secondary, Upper Primary, and Primary schools.
The energy sector in 2011 was largely dependent on hydro power, fossil fuels, with gas and coal contributing significantly to electricity generation. Only 37% of the state was electrified, with a significant rural-urban disparity in electricity access. The Power demand for Assam ranged between 700 MW to 2400 MW at present.

Assam's economy was predominantly agrarian, with agriculture being the largest source of income and employment, and a significant portion of the population residing in rural areas as per census 2011. In 2011, Assam had a workforce participation rate of 53.26% for males and 25.51% for females. This indicates a significant gender gap in employment in Assam. Specifically, the male workforce participation rate was more than double that of females. The significant gender gap in workforce participation in Assam stems from a combination of cultural, economic, educational, and infrastructural factors. Traditional gender roles and social norms prioritize women’s responsibilities in household work and limit their mobility, while early marriage and childbearing further constrain opportunities. Economically, women’s work is often unpaid or informal, with limited ownership of land and assets restricting access to credit and markets. Educational gaps, including high dropout rates and inadequate vocational training, reduce employability. Additionally, poor transport connectivity, lack of safe workplaces and childcare facilities, and weak institutional support further discourage women from engaging in formal and remunerative employment.

Women in Assam are primarily engaged in agriculture, tea plantations, handloom weaving, handicrafts, domestic work, and micro-enterprises through self-help groups. Much of this employment is informal and low-paid. In agriculture and tea gardens, women perform essential tasks. Handloom and handicraft work is largely home-based, with limited market linkages and poor access to credit or modern technology. Domestic work and construction labor also remain unregulated and precarious. Overall, these sectors are not adequately supported or formalized, leaving women workers economically vulnerable and with limited opportunities for skill development and upward mobility.

The state's economy also included sectors like oil and gas production, tea cultivation, and tourism. The growth of 8.42 percent in Gross State Domestic Product (GSDP) of the State for 2011-12 comprises of a growth of 6.43 percent in Agriculture and Allied sector, 7.19 percent in Industry sector and 9.74 percent in sservices sector.

Indigenous Peoples (IP) Profile and Risk Assessment

1. Demographic Profile

Assam is home to a rich diversity of Indigenous Peoples, including both Scheduled Tribes (STs) and Scheduled Castes (SCs), residing across rural, forest, and peri-urban areas.

- In the 2011 census, Assam's Scheduled Caste (SC) population was 2,231,321, which constituted 7.15% of the state's total population,
- In the 2011 Census, Assam's Scheduled Tribe (ST) population was 3,884,371, which constituted 12.4% of the state's total population.
- Major ST Communities include Bodo, Mishing, Karbi, Rabha, Dimasa, Sonowal Kachari, Deori, Tiwa, and others.
- Many communities live in notified Sixth Schedule areas (Autonomous Districts).
- Settlements are often in contiguous clusters within villages and revenue circles.

2. Socio-Economic Conditions

- Predominantly engaged in agriculture, horticulture, fishing, forest-based livelihoods, and wage labor.
- Land holdings are typically small and, in some areas, governed by customary land tenure systems rather than formal titles.
- Literacy rates and access to public services vary, with some groups facing socio-economic marginalization and higher poverty levels.
- The literacy rate for the Scheduled Caste (SC) population in Assam, according to the 2011 Census, was 66.76%. This is compared to the overall literacy rate for Assam, which was 72.19%. The literacy rate for the Scheduled Tribe (ST) population in Assam, according to the 2011 census, is 72.1%.

3. Cultural and Livelihood Practices

- Many IP communities maintain distinct languages, traditions, festivals, and social institutions (e.g., village councils, clan systems).
- Livelihoods are closely linked to natural resources, including shifting cultivation, fishing, and collection of minor forest produce.
- Traditional practices and cultural sites (e.g., sacred groves, burial grounds) are important for identity and heritage.

4. Legal Status and Land Tenure Systems

- Land rights are governed by a mix of formal land revenue laws and customary tenure, especially in hill districts.
- In Sixth Schedule areas (e.g., Karbi Anglong, Dima Hasao), Autonomous Councils have authority over land management and resource use.

4.5.2 District Profile: Kamrup (Metro) District

The district Kamrup Metro was created bifurcating the old Kamrup district in 3rd February'2003. Kamrup Metropolitan District is the capital district of Assam. It comprises of only one sub-divisions namely, Guwahati sadar sub-division. The City Guwahati is the Head Quarter of the District. Once known as *Pragjyotishpur* (the light of the East), Guwahati derives its name from the Assamese words "*Guwa*" means areca nut and "*Haat*" means market. Guwahati today is the seat of power in Assam, a major commercial centre and the node that connects six other North Eastern Indian States of Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya and Tripura. The district is sharing border with Darrang District in east, Nagaon in west, Kamrup District in North and Meghalaya in south. It occupies an area of approximately

1527.84 square kilometres. The climate is moderate. In summer highest day temperature is in between 26 ° C to 36.

It covers a geographic area of approximately 955 square kilometers and is known for its significant urban population, accounting for over 82% of its residents according to the 2011 census. The district is notable for high literacy rates and a diverse cultural makeup.

Agriculture continues to play an important role in the livelihood of a section of the population in Kamrup Metro district. Alongside, the district has a strong presence of small-scale industries such as handloom weaving, handicrafts, bamboo and cane products, food processing, and service-based enterprises. The diverse ethnic groups of the region are engaged in their traditional occupations, including weaving, artisanal crafts, and livestock rearing. Kamrup Metro is also known for its rich cultural heritage and several important historical and archaeological sites

Table 4.8: Kamrup (Metro) district Demographic Profile vis-à-vis Assam

Attribute	Kamrup (Metro) District
Population	12, 53,938
Population Density	1313/km²
SC population percentage	8.12
ST population percentage	5.99
Sex Ratio (number of females per thousand male)	936
Total literacy rate percentage	88.71%
Male literacy rate percentage	92.13
Female literacy rate percentage	85.07
Rural population percentage	17.30%

Source: Census of India 2011 data

Demography & Socio-Economic Condition

According to 2011 census the district has a population of 12.53.938 including 6,47.585 are males and 6,06,353 are females. The district has a sex ratio of 936 (females for every 1000 males) and child ratio of 946 (females per 1000 males) As per 2011 census the major religion in the district is Hindu with 84.89% of the total population. The population density in the district is 1.313 (persons per sq. km.) During the year 2001-2011 the population growth rate in the district was 26.94% including 21.26% were males and 33.63% were females. According to 2011 census the principal language in the district is Assamese and Bengali with 57.87% and 20.56%. In the year 2020 the number of live births in the district was 43.782 out of which 23.660 were males and 20.122 were females. In the same year the number of deaths in the district was 17.235 out of which 9,833 were males and 7,402 were females.

The economy of the district is mainly dependent on both the agricultural and industrial sector. More than half of its population are engaged in agriculture in order to earn their livelihood. The chief agricultural products in the district are wheat, paddy, coconut, sugarcane, orange, pineapple, lemon, coconut, etc. Agriculture and allied activities continue to play an important role in the economy of Kamrup Metropolitan District, particularly in its peripheral and peri-urban areas, engaging an estimated 45–55% of the rural population. Despite the district being predominantly urban and service-oriented, agriculture still

contributes an estimated 10–15% of the Gross District Domestic Product (GDDP), highlighting its significant role in supporting livelihoods, food supply, and the overall local economy. Industrially, Kamrup Metropolitan District is one of the most developed districts in Assam, primarily due to its strategic location around Guwahati and the presence of large, medium and small-scale industries. The district hosts the Guwahati Refinery of Indian Oil Corporation Ltd., India's first public sector refinery, commissioned in 1962, which has a refining capacity of about 1.0 million metric tonnes per annum and acts as a major industrial anchor, generating direct and indirect employment and contributing substantially to state and local revenues. In addition, Kamrup Metro has over 9,000–10,000 registered industrial units, mostly in the MSME sector, operating in areas such as oil and petroleum products, agro-processing, tea processing, food and beverages, garments, engineering goods, construction materials, printing, and wood-based industries, employing around 25,000–30,000 workers. Industrial growth is further supported by warehousing, logistics, wholesale trade, and transport services linked to Guwahati's role as the commercial hub of Northeast India. As a result, the industry and manufacturing sector contributes an estimated 25–30% of the district's Gross District Domestic Product (GDDP), reflecting a well-diversified and robust industrial base. There are two most important tea estates in the district namely Sonapur Tea Estate and Sunchali Tea Estate. which contributes ((≈2.13 million kg tea) contributes an estimated ~0.3–0.4% share of the entire Assam tea made output. The gross domestic product in the district was Rs. 23,61,342 lakhs in the year 2011-2012. The Per Capita Income or NDDP, At Factor Cost is Rs. 1,21,246 in the year 2011-2012.
**(Source: Census of India, 2011; District Census Handbook, Kamrup Metropolitan District; Statistical Handbook of Assam, Directorate of Economics & Statistics, Government of Assam; Economic Survey of Assam (2012–13); District Industrial Profile, Kamrup Metropolitan District)

The district is well known as an abode of several reputed educational institutions and provides a platform for higher education. Some of the most recognised educational institutions in the district are Gauhati University, Cotton College, Handique Girls College, Lalit Chandra Bharali College, Indian Institute of Technology, Assam Engineering College, Gauhati Medical College and Hospital, Assam Engineering Institute and many more. As per 2011 census, the literacy rate in the district is 88.71% including 92.13% are males and 85.07% are females. The district has a literate population of 10,01,191 including 5.37.227 are males and 4,63,964 are females. The district has an illiterate population of 2,52,747 including 1,10,358 are males and 1.42.389 are females.

In the 2011 Census, Kamrup Metropolitan district had an average literacy rate of 88.71%, with males at 92.13% and females at 85.07%. This makes the district the most literate in Assam, reflecting a significant increase from the 2001 census.

As per the 2011 Census, the Employment Rate (Work Force Participation Rate) for Kamrup Metropolitan district was 57.6% for males and a significantly lower 9% for females. This indicates that men are about twice as likely to be engaged in work compared to women in the district. The percentage of persons below the poverty line in rural areas for India as a whole was estimated to be 25.7% in 2011−12 in Kamrup Metro district.

While the life expectancy for the Kamrup Metro district in 2011 was about 62.7 years for males and 65.5 years for females. The general demographic data for the period shows an increase in life expectancy in

Kamarup Metro district. The highest HIV positivity among antenatal care (ANC) clients in the reported period was 0.75% in Kamrup Metro district during the 2012-13 HIV Sentinel Surveillance (HSS) report. While the overall trend in Assam showed an increase during that time The level of HIV positivity among antenatal care (ANC) clients in the district is low, indicating a generally low prevalence of HIV in the area.

As per the Census of India 2011, the total number of elderly persons (aged 60 years and above) in Kamrup Metropolitan district was 55,994, of which 28,320 were males and 27,674 were females. The total population of Kamrup Metropolitan in 2011 was 1,253,938. Based on this, the elderly population accounted for approximately 4.47% of the district's total population. In comparison, the proportion of elderly persons in Assam as a whole was around 8% in 2011. This indicates that the share of elderly population in Kamrup Metropolitan district was significantly lower than the state average.

As per the 2011 Census, the total disabled population in Kamrup Metropolitan district was 20,256. The data indicates a varied distribution across different categories of disabilities. Among these, 2,685 persons had a disability related to seeing, while 4,485 had a hearing disability. Disabilities related to speech accounted for 1,531 individuals, and 2,022 persons reported movement-related disabilities. Additionally, 1,066 individuals were identified with intellectual developmental disability , and 567 with mental illness. The largest share within the disability categories was recorded under "Any Other Disability", with 6,589 persons, followed by 1,311 individuals reporting multiple disabilities.

The total population of Kamrup Metropolitan district in 2011 was 1,253,938. Based on this, persons with disabilities represented approximately 1.62% of the district's total population.

Access to Infrastructure and Services:

Kamrup Metro, particularly its capital Guwahati, has a range of hospital facilities including speciality institutions like Gauhati Medical College and Hospital (GMCH) and private hospitals such as Ayursundra Superspeciality Hospital and Dispur Hospitals. Public health facilities include government hospitals like District Hospital Sonapur and various First Referral Units (FRUs), while other private options include Arhi Hospital and Guwahati Metro Hospital. These facilities offer diverse services, with many accepting Ayushman Bharat (PMJAY) cards for free or subsidized treatment. Moreover, there are 25 Primary Health Centres (PHCs) in the Kamrup Metro district of Assam, according to the Directorate of Health Service - DHS Assam.

The educational institutions in Kamrup Metro district has 425 schools (including primary, middle, and high schools) as of the "Basic Data" by Samagra Shiksha Axom as per 2011 census. Additionally, the District-wise breakup of Government/ Provincialised Schools from the Directorate of Elementary Education (DEE) Assam shows a larger figure of 648 government/provincialised schools. For technical and higher education, the district has 26 polytechnic institutions and 2 government engineering colleges, according to the Govt. of Assam Higher Education department.

The district receives electricity from the state grid, which is utilized for various purposes, including domestic, industrial, and commercial use. Conventional grid-based electricity is primarily used for domestic and industrial needs.

Livelihood and Economic Activities:

The Kamrup Metropolitan district, with Guwahati as its headquarters, was the economic hub of Assam and the entire North Eastern Region in 2011. The district's economy was predominantly urban-oriented, shaped

by trade, services, transportation, education, and administration.

Urban and Service-Sector Dominance: Unlike most districts of Assam, agriculture played only a minor role in Kamrup Metro's economy. With over 80% of its population classified as urban (Census 2011), Guwahati emerged as the state's largest commercial and service centre.

Industry and Manufacturing: Manufacturing was limited but growing in 2011. The district hosted small- and medium-scale industries, particularly in food processing, printing, furniture, construction materials, and light engineering. The Lokhra and Bamunimaidam Industrial Estates supported some manufacturing activities, though large-scale industries were not concentrated in the district.

Agriculture and Allied Activities: Agriculture was of marginal importance compared to other districts of Assam. Paddy, vegetables, and fruits (notably bananas and pineapples in peri-urban areas) were grown mainly in the rural fringes. Dairy, poultry, and fisheries supported local demand but were insufficient to meet the growing urban consumption, leading to heavy inflows of goods from other districts and states.

Employment and Livelihoods: According to Census 2011, the Work Participation Rate (WPR) in Kamrup Metro was about 35%, lower than the state average, reflecting its urban character. A significant proportion of workers were engaged in tertiary activities, especially trade, commerce, transport, and government service. Informal employment was high, particularly among street vendors, small traders, transport workers (rickshaw, auto, bus services), and construction labour.

Infrastructure and Connectivity: The district's economy in 2011 was strongly influenced by its role as the "Gateway to the North East." Guwahati was the region's transport hub, with:

- The Lokpriya Gopinath Bordoloi International Airport connecting the city to major Indian metros.
- Guwahati Railway Station serving as the primary rail junction of the region.
- National Highways (NH-31, NH-37, NH-40) linking the district to the rest of Assam and neighbouring states.

This connectivity supported the rapid growth of trade and services.

Gender role and Dynamics:

The prevalence of gender-based violence (GBV) in Kamrup Metropolitan district, with Guwahati as its core urban center, is a significant social concern. The district records 4529 numbers of reported cases of violence against women in Kamrup Metro district over the last decade (2005–2015), largely due to its urban setting, better reporting mechanisms, and access to police and helpline services. However, survey data (e.g. from NFHS – National Family Health Survey) suggests that in Kamrup (Metro), *occurrence* (i.e. women's reports of having suffered physical or sexual violence) is lower compared to many other districts, especially rural ones. The National Family Health Survey (NFHS-4) indicates that a limited percentage of women in Assam have experienced physical or sexual violence, a trend that likely reflects conditions in districts like Kamrup Metro district.

Kamrup Metropolitan district, which includes Guwahati city, reflects a blend of traditional Assamese cultural values and the influences of rapid urbanization. Gender norms in the district are shaped by both long-standing social practices and evolving modern attitudes. Traditionally, Assamese society has been considered relatively gender-inclusive compared to many other regions, with women actively participating in household decision-making, weaving, agriculture, and cultural activities.

Urbanization in Guwahati has contributed to growing participation of women in education, government services, private employment, and business sectors. Despite this progress, gender disparities remain visible in employment opportunities, wage levels, and representation in leadership roles.

Civil society initiatives, government programs, and educational institutions in the district continue to advocate for gender equality, women's empowerment, and enhanced participation in socio-economic development. Overall, gender norms in Kamrup Metro are in a state of transition—balancing traditional expectations with modern, more equitable perspectives.

PCRs/CPRs/ Archaeological and Historical Monuments

As per the check survey, no impact is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs) or archaeological/historical sites as assessed during the check survey. However, there are schools, an Anganwadi Centre (AWC), MPHC Hospital places of worship like Temple, Masjid and Church located beyond the RoW. Moreover, no such monuments are coming in the proposed route alignments. Furthermore, Utmost care shall be taken during the check survey to avoid such areas. However, if any archaeological or cultural artifacts are discovered during construction, all work in the area will be stopped immediately, the site will be secured, and the concerned authorities will be notified prior to resuming of construction activities.

The major archaeological and historical monuments found in N Kamrup Metro district is as follows:

1. The Nazirakhat archaeological park is located Lomati Gaon, Tepasia in Kamrup Metro District which is 9 Km from Sonapur substation site.
2. The Na-Math, Kamakhya archeological is located in Guwahati, Kamrup (M) District which is about 43 Km from Sonapur substation site.
3. The Karbi Memorials Archaeological Site is located at Dakhinbam, Sonapur, District: Kamrup Metro is 30.2 Km from Sonapur substation site.
4. The Ambari Archaeological Site, located in Kamrup (M), Guwahati is about 30 km from Sonapur substation site.
5. The Vasistha Temple, Guwahati, Kamrup (M) District Site located at Guwahati is about 25 Km from Sonapur substation site.
6. The Kajalichaki Archaeological Site, Chandrapur, Kamrup (M) District is located at Chandrapur, Kamrup Metro District is about 25.7 Km from Sonapur substation site situated far from the proposed transmission line area.

4.5.3 Study Area Profile

The study area, for the 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Transmission Line at Sonapur is spread across 13 villages namely Moupur, Alenga, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Aprikola, Burni, Sarutari, Sonapur and Sonapur Pathar under Sonapur Tehsil in Kamrup Metro District.

Sonapur, located in **Kamrup Metropolitan district** about 20 km from Guwahati city along National Highway

37, is an important administrative subdivision with both rural and semi-urban characteristics. Covering an area of around 402 sq. km, the region is predominantly rural, with nearly 90% of its population residing in villages. As per Census 2011, Sonapur has a population of about 1.43 lakh, with a sex ratio of 971 females per 1,000 males. The area is home to diverse communities, including Tiwa (Lalung), Boro, Assamese, and Karbi, with Hinduism being the major religion, followed by Muslim and Christian minorities.

Agriculture forms the backbone of the local economy, supplemented by small-scale trade and services, while a significant portion of the workforce is engaged in marginal and seasonal activities. The region hosts key institutions such as Sonapur College and the North East Regional Centre of Lakshmibai National Institute of Physical Education at Tepesia, along with a district hospital catering to health needs. Sonapur experiences a subtropical climate with heavy monsoon rainfall and occasional flooding. Despite its proximity to Guwahati and good road connectivity, several villages in Sonapur face some challenges such as limited educational facilities beyond the primary level, limited livelihood options, and health services. However, ongoing initiatives, including ICT-based community centres and development programs, are gradually improving access to information, services, and opportunities, positioning Sonapur as a transitional zone between rural livelihoods and growing urban influence.

In terms of education, the overall literacy rate in Sonapur Block, as recorded in the 2011 Census, was 67.02 percent, with male literacy at 72.37 percent and female literacy at 61.50 percent. and an overall literacy rate of 67.02%, where female literacy lags behind male literacy.

In Sonapur Block, it is estimated that 31.6% of all workers were directly engaged in farming and agricultural labour. In the villages of Sonapur/nearby areas typically operate around 1.3–1.5 hectares of land on average, with most landholders being small or marginal farmers.

Scheduled Caste (SC) Population – Kamrup (Metro) District and Sonapur Circle

- **Total SC Population:**

As per the **2011 Census**, the Scheduled Caste (SC) population in **Kamrup Metropolitan district** was **101,789**, while the **Sonapur Circle** accounted for **22,138** SC persons.

- **Sex Ratio:**

The sex ratio among the SC population in Kamrup Metro stood at **954 females per 1,000 males**, whereas Sonapur Circle reported a similar sex ratio of **948 females per 1,000 males**, reflecting a slightly lower proportion of females.

- **Literacy Rate:**

Literacy levels among the SC population in the district were relatively high, in line with the urban and semi-urban character of Kamrup Metro, where access to educational institutions is better compared to rural regions. The overall literacy rate for Kamrup Metropolitan district in 2011 was 88.71%. In Sonapur Circle, the total literacy rate (for all residents) was 76.71%

- **Population Distribution:**

As per the 2011 Census, the Sonapur Circle (in Kamrup Metropolitan district) had a total population of 143,371. Of this, 89.9% (128,949 people) lived in rural areas, while only 10.1% (14,422 people) lived in urban

areas. The circle consists of 3 towns and 142 villages, demonstrating that it is overwhelmingly rural in character. Children aged 0–6 numbered is 18,123, constituting about 12.6% of the total population, of which 16,390 were in rural parts and 1,733 in urban parts. This shows a fairly young population, with a substantial portion in the young children age bracket. Further, the population aged 7 years and above, including the elderly, is 125,248, which constitutes about 87.4% of the total population of Sonapur Circle (Census 2011). **(Source: Census of India, 2011; District Census Handbook, Kamrup Metropolitan District; Statistical Handbook of Assam, Directorate of Economics & Statistics, Government of Assam; Economic Survey of Assam (2012–13).

In terms of demographic distribution by social groups, Scheduled Castes made up 15.4% of Sonapur's population overall, with nearly the same share (15.4%) in rural areas and slightly more (15.7%) in urban parts. Similarly, Scheduled Tribes accounted for 14.4% overall, with 15.4% in rural zones and only 5.1% in urban areas.

- **Occupational and Economic Characteristics:**

In terms of occupational characteristics, the SC population in Kamrup Metro is engaged in a mix of livelihoods—ranging from government and private sector employment in urban centres like Guwahati to traditional and semi-skilled occupations in the Sonapur Circle, where many households depend on agriculture, wage labour, small businesses, and service-related work. Overall, the SC population in both Kamrup Metro and Sonapur reflects a diverse socio-economic profile shaped by urban influence as well as rural livelihood patterns.

As per the **2011 Census**, the Scheduled Caste (SC) population of **Kamrup Metropolitan district** was **101,789**, constituting approximately **8.12%** of the district's total population of 1,253,938. The SC community in Kamrup Metro is distributed across both urban and peri-urban areas, with a significant concentration in the rural and semi-urban pockets located outside the central urban core of Guwahati city. Although the district is predominantly urban, many SC households continue to reside in the outskirts where traditional forms of livelihood—such as wage labour, small-scale trade, and service-related occupations—remain common. The urban setting has also facilitated increased access to education, government employment, and diversified economic opportunities for SC individuals. Overall, the SC population in Kamrup Metro reflects a mix of traditional and urbanized socio-economic characteristics shaped by the district's rapidly growing metropolitan environment.

Scheduled Tribe (ST) Population – Kamrup (Metro) District and Sonapur Circle

- **Total ST Population:**

As per the 2011 Census, the Scheduled Tribe (ST) population in Kamrup Metropolitan district was 75,121, consisting of 37,902 males and 37,219 females, which represents about 6.0% of the district's total population.

In the Sonapur Circle, out of a total population of 143,371, 20,625 people belonged to Scheduled Tribes. The ST population in Sonapur, therefore, accounts for 14.4% of the Circle's population, significantly higher than the district average.

- **Sex Ratio:**

As per the 2011 Census, Kamrup Metropolitan district recorded a sex ratio of 936 females per 1,000 males, indicating a relatively lower number of females compared to males in the district. Within the district, the rural areas had a somewhat higher sex ratio of 953 females per 1,000 males, while the urban areas had a slightly lower ratio of 933.

In the Sonapur Circle, which is a sub-division of Kamrup Metro, the overall sex ratio stood at 971 females per 1,000 males, according to the 2011 Census. Rural parts of Sonapur had a sex ratio of 974, compared to 946 in the urban parts of the Circle.

This comparatively higher sex ratio in Sonapur suggests a more balanced gender composition in that Circle than in Kamrup Metro as a whole.

- **Literacy Rate**

The literacy rate for the Scheduled Tribe (ST) population in Kamrup Metropolitan district or Sonapur Circle as per 2011 census is the District Census Handbook for Kamrup Metropolitan notes a rural ST literacy rate of 77.88% for the district. For Sonapur Circle, the overall literacy rate (all communities) is 76.71% according to census data.

- **Population Distribution:**

The Scheduled Tribe (ST) population of Kamrup Metropolitan district totals 75,121 persons, forming about 6% of the district's total population. The major ST communities in the district include Bodo, Rabha, Karbi, Tiwa (Lalung) and smaller numbers of Mishing and other tribes. These communities have a long-standing historical presence in the Kamrup region, much prior to the expansion of Guwahati city, and are primarily concentrated in the peri-urban and rural fringes such as Sonapur and adjoining areas.

Traditions and Social Practices:

ST communities in the district retain distinct cultural identities, including traditional festivals, folk music, dances, and customary institutions. Festivals such as Bwisagu (Bodo), Baikho (Rabha) and Ali-Aye-Ligang (Mishing) are associated with agricultural cycles and seasonal changes. Social organization is largely community-based, with strong kinship ties and collective decision-making at village level.

Customary Land Use and Livelihoods:

Traditionally, ST households practice agriculture and allied activities, including paddy cultivation, horticulture, fishing, livestock rearing and use of nearby forest and common lands for subsistence needs. Land use is often customary in nature, with reliance on inherited holdings and community-recognized rights rather than formal land titles in some cases. These lands are integral to their livelihood security, cultural practices and social identity.

Duration of Presence and Current Context:

The ST communities have been residing in the area for several generations, and in many cases for centuries. With rapid urbanization of Kamrup Metro, parts of their traditional settlements have become peri-urban, leading to changes in livelihood patterns, increasing dependence on wage labour and non-farm employment, while still maintaining cultural and social traditions.

Overall, the ST population of Kamrup Metropolitan District represents a socially and culturally distinct group with deep historical roots, whose traditional land use, livelihoods and cultural practices continue to be closely linked to the local landscape.

Although Kamrup Metro is predominantly urban due to the presence of Guwahati city, a significant portion of the ST population resides in the rural and peri-urban areas of the district, where traditional tribal settlements and community clusters continue to exist. The Sonapur Circle, which forms part of the rural–peri-urban zone of Kamrup Metro, has a comparatively higher concentration of ST population, with 20,625 individuals belonging to Scheduled Tribes. This accounts for 14.4% of Sonapur's total population, making it one of the key areas in the district where tribal communities are more prominently represented

Moreover, in the case of the 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Transmission Line, screening was conducted to determine the presence of Indigenous Peoples in accordance with the four defining characteristics outlined under **ESS 3**.

The screening findings, verified through field observations and meaningful public consultations conducted with the tribal households (Refer **Appendix 15** Photographs and attendance sheet of public consultation with Tribal households) indicate that although these individuals belong to the Scheduled Tribe (ST) Plains community and are affected by the proposed transmission line, they do not exhibit the substantive socio-cultural characteristics typically associated with Indigenous Peoples as per ESS 3 specifically:

1. **Self-identification and recognition by others:** The affected individuals and groups identify as members of the ST Plains community. Their ST status reflects constitutional recognition as a distinct social group; however, the affected households are largely integrated into the mainstream socio-economic system and do not exhibit key characteristics associated with Indigenous Peoples under ESS 3. Specifically, they do not demonstrate collective attachment to a geographically distinct ancestral territory, dependence on customary natural resources, distinct traditional governance institutions, or socio-cultural practices that differentiate them from the surrounding non-tribal population. Accordingly, for the purpose of this project, they are recognized as ST individuals/groups rather than as a distinct Indigenous Peoples group under ESS 3.
2. **Collective attachment to ancestral territories or natural resources:** Based on field verification, stakeholder consultations, and review of available socio-economic information, the affected individuals do not demonstrate collective attachment to any geographically distinct habitat, ancestral territory, or specific natural resources within the project area. Furthermore, consultations with local community members, village representatives, and affected households confirmed the absence of customary land tenure systems or collective natural resource use linked specifically to the project area. Therefore, the affected individuals do not exhibit the characteristics of collective attachment to ancestral territories or natural resources as defined under applicable safeguard policies.
3. **Distinct customary institutions:** The affected households follow the same administrative, social, and political systems as the dominant local society, with no separate customary institutions governing their affairs.
4. **Distinct language:** The affected individuals communicate primarily in Assamese and do not possess a distinct indigenous language different from the official or regional language.

In the project area of 400kV Silchar-Byrnihat transmission line does not fall under the Scheduled Areas as defined under the provisions of the Indian Constitution. Scheduled Areas are characterized by a significant tribal population and are granted special constitutional protections to safeguard their social, cultural, and economic interests.

Based on the check survey carried out along the transmission line routes, it is important that the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP) clearly identify and document:

Potential Impacts:

- **Temporary and permanent land use impacts, including those affecting agricultural lands of tribal households.**
- **Risks of disruption to social cohesion and cultural practices if tower siting or access roads intersect community lands or sensitive areas.**
- **Scheduled Tribe households may encounter challenges in enhancing their livelihood opportunities.**

Mitigation and Safeguard Measures:

- **Conducting meaningful consultations with affected tribal households, and accordingly public consultation was carried out with the tribal community on 8th August, 2024 at Anthaibari village. Details are provided in Appendix 4A and 4B.**
- **Ensuring equitable compensation and assistance measures in line with national regulations and international safeguard requirements.**
- **Facilitating capacity-building and grievance redress mechanisms that are accessible and responsive to tribal communities.**

Continuous monitoring and reporting of safeguard implementation to ensure transparency and accountability in Scheduled Areas.

Furthermore, the project area is not located within a Sixth Schedule area under the Indian Constitution.

5 ANALYSIS OF ALTERNATIVES

This chapter elucidates detailed analysis about different options of transmission line route alignment with respect to design, environmental, social and economic aspects during project conception and planning phase.

It is to be noted that during ESIA study, the route for transmission line was already finalized by AEGCL considering following environmental and social criteria for route selection apart from the technical consideration:

- TL route does not involve any human settlement;
- TL route does not affect on any archaeological / cultural monument;
- Avoid forest area;
- TL route does not pass through any protected area such as National Park / Wildlife Sanctuary;
- TL route avoid disturbance to public utility services such as school, hospital playground, bus stop etc.;

Further, optimization was done during the detailed survey. During route alignment, all possible efforts were made to avoid the environmental and social sensitivities or to keep it to the minimum. Following table shows the analysis of 3 Alternative routes.

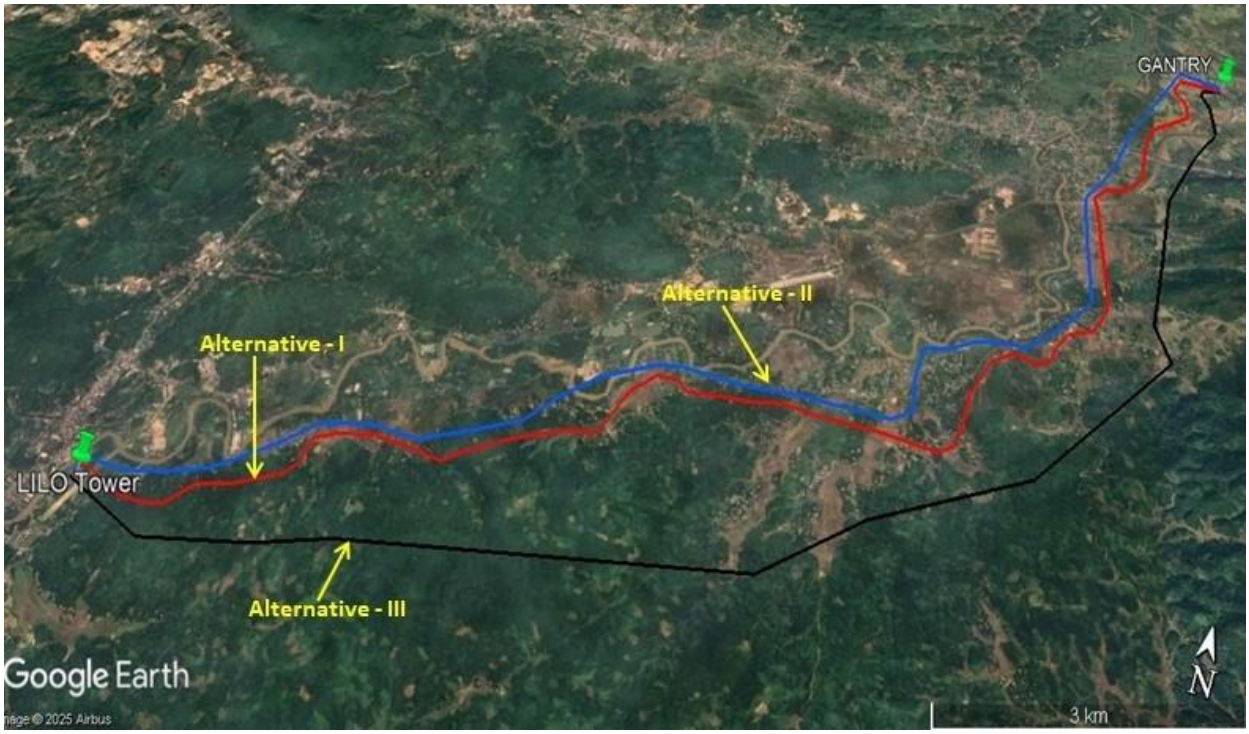


Figure 5.1: Map showing all three alternative transmission lines routes of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

Table 5.1: Assessment of Alternative Routes

Description	Alternative- I (Optimum/Proposed Route)	Alternative-II	Alternative-III
400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line – 19.500 km			
Route Length (in Kms.)	19.500 KM	20.756 KM	21.465 KM
Angle Point	60	68	65
River Crossing (Major)	NIL	NIL	NIL
River Crossing (Minor)	NIL	4	NIL
Forest (Reserved Forest & Protected Forest)	3.1 KM	5.6 KM	4.3 KM
Tea Garden (Affected Route length)	550 m	820	735
Low Land Area	NIL	NIL	NIL
Habitation area	Mostly avoided	Partially involved (Passing through Brick Industry)	Partially involved (Passing through Cement Industry)
Railway Crossing	1 Location	1 Location	1 Location
Power Line crossing	5 Locations	7 Locations	9 Locations

Description	Alternative- I (Optimum/Proposed Route)	Alternative-II	Alternative-III
Road crossing	Crossing at NH-27 and village roads involved.	Crossing at NH-27 and village roads involved.	Crossing at NH-27 and village roads involved.
Trees / Bamboo	11504	14057	15308
RoW issues	Anticipated very few	Anticipated very high	Anticipated very high
Compensation related issues	Anticipated to be minimum	High	High
Accessibility to tower location	Easily accessible	Difficult to access	Difficult to access

Source: Check Survey report

Pros and cons of the alignment options

Technological options for towers, construction methodology options considered for the project components are as follows:

- Optimum route length;
- Minimum nos. of angle towers to reduce the tension;
- Minimum nos. of crossing lines, highway, railway, other transmission lines, river crossing;
- Maintain distance from the Air defense / Air traffic;

The following areas, however, are to be avoided as far as possible while selecting the routes of the line:

- Tough inaccessible areas where approach is difficult.
- Towns and villages, leaving sufficient margin for their growth.
- Areas subject to floods and other natural hazards gushing nalas during rainy seasons, tanks, ponds, lakes, etc.
- Wooded areas with high trees or fruit bearing trees involving payment of heavy compensations for cutting of the trees.
- Swamps and shallow lands subject to flood, marshy areas, low lying lands, river beds and earth slip zones, etc. involving risk to stability to foundations.
- High hillocks / hilly areas / sand dunes and areas involving abrupt changes in levels and requiring too many long spans.
- Series of irrigation wells.
- Shooting areas and other protected areas such as army / defence installations/ ammunition depots, areas of archaeological importance, forest areas and wild life sanctuary.
- Areas which involve risk to human life, damage to public & private properties, religious places, cremation grounds, quarry sites and underground mines, gardens, orchards and plantations.
- Areas that may create probable RoW issues particularly in built-up areas or locations with existing encroachments and utilities are to be avoided while selecting the route.
- Buildings/ Storage areas for explosives or inflammable materials, bulk oil storage tanks, oil or gas pipelines, etc.

Based on the latest design of Tower considering soil condition and seismic hazard, optimization of line length, selection of appropriate tower based on the profile of the line and tower spotting data has been

done. Also, number of towers and type of tower has been selected to minimize *Zirat* damage (surface damage) and minimize the area involved for tower location.

Justification for the selected alignment option

400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line: Alternative III is longest in length than Alternative I & II. Angle Point in alternative I is less i.e. 60 as compared to alternate II & III, i.e. 68 & 65 respectively. Route length of Alternative I is shorter than alternate II & III. Also based on Environmental & Social considerations analysed for all the three route alternatives, Alternative I route is found to be most feasible. Based on above facts, Alternative I was considered as the most optimal route and recommended for erection of transmission line.

6 ASSESSMENT FOR POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This chapter outlines the impact assessment methodology and summarizes the anticipated project impacts on the physical, biological and social environments. It includes biodiversity & critical habitat assessment using tools such as AVISTEP, IBA/KBA mapping tools. The assessment is based on baseline features of the project during its design, construction & operation phase. Additionally, the chapter presents suggested mitigation measures for all identified impacts and provides a summary of overall impact assessment.

6.2 Impact Assessment Methodology

The Environmental Impact Assessment (EIA) methodology for transmission line projects involves a systematic evaluation of potential environmental and social impacts during the design, construction, and

operation phases. The assessment is conducted in line with relevant GoI guidelines/regulations, AIIB environment & social framework & international best practices. A proximity analysis was undertaken to assess the alignment of the proposed transmission line with respect to Key Biodiversity Areas (KBAs) and Important Bird and Biodiversity Areas (IBAs). Analysis by using Integrated Biodiversity Assessment Tool (IBAT) has also been done. This spatial analysis helps identify ecologically sensitive zones and potential wildlife corridors that may be impacted by the project. To address avian risks, the AVISTEP (Avian Sensitivity Tool for Energy Planning) tool is used to assess bird collision sensitivity. AVISTEP integrates spatial data on bird migration, habitat, and behavior to highlight high-risk zones, thereby guiding the design of mitigation strategies such as rerouting, installation of bird diverters, and seasonal construction planning.

The overall impact assessment process combines GIS-based analysis, field surveys, stakeholder consultations followed by the formulation of avoidance, minimization, and compensatory measures. The outcomes feed into the Environmental and Social Management Plan (ESMP), ensuring compliance and sustainable implementation of the project.

6.2.1 Screening and Scoping

Screening and scoping are critical initial steps in the Environmental Impact Assessment (EIA) of transmission line projects. Screening determines whether the project requires a full EIA based on its scale, location, and potential impacts. As per the AIIB, transmission line projects are screened as Category B: Projects with limited, site-specific, and reversible impacts. Scoping identifies the key environmental issues to be studied in detail, such as impacts on forests, wildlife, communities, and electromagnetic fields. Together, they help streamline the assessment process, ensuring focus on significant environmental concerns and facilitating informed decision-making.

Identification of impacts of proposed transmission project on Physical, Biological & Social environments of the project area are summarized below.

Table 6.1: Screening for Impacts

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
Physical Environment		
Land use Land cover	In general the land use of the project area, including transmission line RoW and tower footing are agricultural land, some habitation area etc. The Right of Way is considered 46 Mtr. Area required for transmission tower for the LILO line:- for DA type towers 246 to 356 sqm, DB type towers 304 to 465 sqm, DC type	● Permanent change in land use at Tower locations. ● Limited change in land use of the RoW of Transmission line in form of restrictions on activities such as growing of high trees;

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
	towers 365 to 556 sqm and DD type towers 439 to 886 sqm.	
Topography	Topography of Kamrup (Metro) district in Assam exhibits a geology characterized by mixed plains and foothills. The soils are primarily alluvial, classified as alluvial soils (Entisols), old riverine alluvial soils (Inceptisols), mountain valley alluvial soils (Ultrasols) and laterite red soils (ultisols) in nature are mainly plain including some hilly areas. Topography of the project area of transmission line is mostly plain land.	There will be no significant change in the existing topography due to implementation of this project.
Soil	The major groups of soils identified in the Kamrup (Metro) district are recent riverine alluvial soils (Entisols), old riverine alluvial soils (Inceptisols), mountain valley alluvial soils (Ultrasols) and laterite red soils (ultisols). The flood plain of Brahmaputra is built up with riverine alluvial soils. The valleys soils are characterized sandy loam to clay, which are not affected by the flood. The northern part of the district lying at the foothills of Bhutan is built up of old mountain valley alluvial soils, which are heavy textured soils. In the laterite red soils, iron and aluminum are found along the southern hilly tracts of the district.	● Generation of construction debris; ● Impact on soil and land environment due to improper management of domestic solid waste; ● Improper storage and handling of hazardous materials (e.g., fuel and lubricant) and generation of hazardous waste during operation. ● Waste generated from operation of construction equipment and machinery and their maintenance leading to soil contamination due to leakage / spillage;
Water Resources and Quality	Ground water in the Kamrup (Metro) consists of two broad hydrogeological units – 1) Pre-Cambrian consolidated rocks and 2) Quaternary alluvium consisting of unconsolidated sediments. Pre-Cambrian consolidated rocks are confined to hilly areas and inselbergs, where ground water occurs in shallow weathered zone and this can be developed through open wells. The joints and fractures developed due to tectonic activities form potential water bearing zones and suitable for development through construction of bore wells.	Insignificant stress on local water resources due to water requirement for the foundation activities, labour camp;
Drainage	Transmission line does not pass through minor river and canals in tower locations.	No potential impacts due to sediments including residual construction waste transport to nearby water bodies from tower locations.

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
Ambient Air Quality	Based on the observation at site it has been perceived that the ambient PM/air quality measurements exceed WHO AQ standard. . The ambient air quality measurements are within the permissible limit of NAAQS but exceed the WHO AQ standards.	Dust emissions associated with foundation activities at tower locations, transportation of construction material, machineries etc.
Ambient Noise Level	Based on the observation at site it has been perceived that the ambient noise level of the project footprint and study area is good.	● Noise generation due to movement of vehicles; ● Noise from construction activities; ● Generation of noise during operation of DG Set.
Biological Environment		
Ecology	Critical wildlife habitats are not present in the project area since the land use is primarily agricultural land, forest land, water bodies, tea garden and some residential areas etc. The project area specifically the transmission line corridor does not involve part of any critical wildlife habitats (IBA/KBA Sites). However, the transmission line's Right-of-Way (RoW) in few sections does encompass West Aprikola Reserve Forest, a legally protected and notified forest land by Govt. of Assam. Further Amchang WLS (KBA) lies within the AoI of the T/L and there may be a risk of bird collision, for which necessary mitigation measures provided in table 6.7.	● Removal of vegetation causing impact on ecology of the area; ● Habitat destruction during temporary laying of wires adjacent to the RoW of transmission lines; ● May collision and electrocution risks to avifauna and other fauna during operational phases.
Occupational health and safety	Workers may also face physical hazards from working at heights, lifting heavy materials, and operating machinery. Prolonged exposure to noise, extreme weather conditions, and electromagnetic fields can further impact health. Additionally, poor ergonomics and inadequate personal protective equipment (PPE) may contribute to musculoskeletal injuries and long-term health issues if safety protocols are not strictly followed.	● Occupational health hazards due to dust; ● Exposure to noise during construction activities; ● Safety risk due to wrong handling of construction machinery, working at height, during stringing and erection; ● Exposure of workers to Electromagnetic field (EMF) while working in proximity to charged electric power lines during operation and maintenance.
Social Environment		

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
Demographics	The study area of 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar-Byrnihat Transmission Line tower base is comprised of land from thirteen villages namely: Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar.	● Influx of people for employment opportunity. ● Migrant labour from other districts. ● Potential for social conflict and unrest due to conflict of local community with labourers.
Economy and Employment	The economy of the district is mainly dependent on both the agricultural and industrial sector. More than half of its population are engaged in agriculture in order to earn their livelihood. The chief agricultural products in the district are wheat, paddy, coconut, sugarcane, orange, pineapple, lemon, coconut, etc. Every year a huge chunk of revenue comes from the agricultural products in the district helps in its economy to a great extent. Industrially, also the district is quite well developed. There are two most important tea estates in the district namely Sonapur Tea Estate and Sunchali Tea Estate. The district is fortunate enough to have the Guwahati Refinery, the first public sector refinery in India inaugurated on 1st January, 1962 which contributes in its economy remarkably. The gross domestic product in the district was Rs. 23,61,342 lakhs in the year 2011-2012. The Per Capita Income or NDDP, At Factor Cost is Rs. 1,21,246 in the year 2011-2012.	● For the project activities, job opportunities will be created, with an estimated 70% of these opportunities likely to benefit the local community. ● Indirect positive impact on local economy through development of secondary amenities.
Land based, Livelihood	The study area of 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Transmission Line will involve temporary/permanent land use, which is expected to impact livelihoods, particularly agricultural activities such as paddy (rice) cultivation in RoW and tower base area.	● Due to project activities the loss of access (temporary and permanent) parcels of land for transmission tower foundation / erection activities will impacts on livelihood. ● Erection of transmission tower will result in an impact on approx. 13 tower location including one tower on Tea estate. The Project Affected Persons (PAPs) within the Right of Way (RoW) have not yet been identified, as the final PAP for RoW alignment and

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
		associated impact footprint are still under progress. ● While the construction of towers is not likely to result in landlessness or physical displacement, it will result in crop losses during construction and operation .
Loss of CPRs, and Access	The land within the RoW of the Transmission Lines is mainly of Agriculture land and some fall on government land and some fall on Forest land. No CPRs are available within the RoW.	However, if there is any loss of access to common property resources (CPRs) during the construction of the transmission line, it shall be addressed in the Abbreviated/ Resettlement Action Plan (A/RAP).
Community health and safety	● Most of the tower locations are situated beyond residential areas and other sensitive zones, and therefore, no electromagnetic radiation impact on the surrounding community is anticipated. ● Labours in close proximity to community.	● Transportation of tower components, other construction materials and increased vehicular movement will lead to traffic hazards for community residing close to the access roads; ● Damage to access roads. ● Potential gender-based violence (sexual exploitation and abuse/sexual harassment)
Labour Welfare	● The labours would be engaged by the EPC contractor. ● The labour engaged would include both local and migrant workers from other districts of Assam.	● The key potential impacts in terms of labour welfare include the following: ● Access to resources such as water, sanitation, cooking fuel etc.; ● Conflict with local community. ● Timely payment of wages and other labour compliances.

6.2.2 Identification of Impacts

Various project features and activities that could reasonably act as sources of impact have been identified for detailed assessment across different stages of the project, as follows:"

Planning and Construction Phase

- Land use and Land cover
- Soil environment
- Water resources and quality
- Drainage
- Ambient air quality
- Ambient noise level

- Occupational health and safety
- Flora and fauna- vegetation Clearance
- Flora and fauna- Construction activities
- Impact on Private Land owners in Tower Base Area and below conductors during Stringing Exercise
- Impact on private land owners within RoW due to imposition of land use restrictions
- Impacts due to Labour Influx
- Impact on Community Health and Safety
- Impact on Economy and Employment in the Study Area

Operation Phase

- Soil Environment
- Noise Level
- Visual Impacts
- Electro-magnetic fields
- Health and safety
- Flora and fauna- Collision and Electrical hazards for avifaunal species
- Impacts of economic loss due to damage to standing crops during maintenance work
- Impact on Community Health and Safety

6.2.3 Assessment of Impact Significance

Table 6.2: Impact Assessment Significance

Significance Rating	Interpretation
Very High	Impacts where an accepted limit or standard is far exceeded, changes are well outside the range of normal variation, or where long-term to permanent impacts of large magnitude (or consequence) occur to highly sensitive resources or receptors. For adverse residual impacts of very high significance, there is no possible further feasible mitigation that could reduce the impact to an acceptable level or offset the impact, and natural recovery or restoration is unlikely. The impact may represent a possible fatal flaw and decision making will need to evaluate the trade-offs with potential social or economic benefits. Positive social impacts of very high significance would be those where substantial economic or social benefits are obtained from the project for significant duration (many years).
High	Impacts where an accepted limit or standard is exceeded; impacts are outside the range of normal variation or adverse changes to a receptor are long-term. Natural recovery is unlikely or may only occur in the long-term and assisted and ongoing rehabilitation is likely to be required to reduce the impact to an acceptable level. High significance residual impacts warrant close scrutiny in decision-making and strict conditions and monitoring to ensure compliance with mitigation or other compensation requirements. Positive social impacts of high significance would be those where considerable economic or social benefits are obtained from the project for an extended duration in the order of years.
Medium	Moderate adverse changes to a receptor where changes may exceed the range of natural variation or where accepted limits or standards are exceeded at times. Potential for natural recovery in the medium-term is good, although a low level of residual impact may remain. Medium impacts will

Significance Rating	Interpretation
	require mitigation to be undertaken and demonstration that the impact has been reduced to as low as reasonably practicable (even if the residual impact is not reduced to Low significance). Positive social impacts of medium significance would be those where a moderate level of benefit is obtained by people or a community, or the local, regional or national economy for a sustained period, generally more than a year.
Low	Minor effects will be experienced, but the impact magnitude (or consequence) is sufficiently small (with and without mitigation) and well within the range of normal variation or accepted standards, or where effects are short-lived. Natural recovery is expected in the short-term, although a low level of localised residual impact may remain. In general, impacts of low significance can be controlled by normal good practice but may require monitoring to ensure operational controls or mitigation is effective. Positive social impacts of low significance would be those where a few people or a small proportion of a community in a localised area may benefit for a few months.
Very Low	Very minor effects on resources or receptors are possible but the predicted effect represents a minimal change to the distribution, presence, function or health of the affected receptor and no mitigation is required.
Insignificant	Predicted impacts on resources or receptors of very low or low sensitivity are imperceptible or indistinguishable from natural background variations, and no mitigation is required.

The significance of an impact is based on expert judgement of the sensitivity (importance or vulnerability) of a receptor and the magnitude (or consequence) of the effect that will be caused by a project-induced change. In summary, the impact assessment method is based on the following approach:

Significance = Magnitude x Sensitivity
Where, Magnitude = Intensity +Extent + Duration

Once ratings are applied to each of these parameters the following matrix is used to derive Significance:

Table 6.3: Impact Sensitivity Assessment Matrix

		SENSITIVITY				
		VERY LOW	LOW	MEDIUM	HIGH	VERY HIGH
MAGNITUDE (OR CONSEQUENCE)	VERY LOW	NEGLIGIBLE	NEGLIGIBLE	VERY LOW	LOW	LOW
	LOW	VERY LOW	VERY LOW	LOW	LOW	MEDIUM
	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	HIGH
	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	VERY HIGH
	VERY HIGH	HIGH	HIGH	HIGH	VERY HIGH	VERY HIGH

Broad definitions of impact significance ratings are provided in the table below. Impacts of 'High' and 'Very High' significance require careful evaluation during decision-making and need to be weighed up against potential long-term socio-economic benefits of the project to inform project authorization. Where there are residual biodiversity impacts of 'High' and 'Very High' significance this will require careful examination of offset feasibility and confirmation that an offset is possible prior to decision-making.

6.2.4 Preparation of Environment and Social Management Plan

The universally accepted mitigation hierarchies adopted for impact assessment is described below:

- Avoid, if possible;
- If avoidance is not possible reduce the magnitude of the impact by applying mitigation measures at source;
- If mitigation measures at source of impact did not succeed to mitigate the impact, then abatement or compensatory measure or offsets are recommended.

The mitigation measures recommended in individual impact assessments will be compiled for project construction and operation phases. The ESMP prepared has also taken organization structure for implementation of mitigation measures.

6.3 Impacts on Physical Environment

Impact assessment focuses on the following which are impacted due to the project activities.

- Land use and land cover;
- Soil environment;
- Ambient Air Quality;
- Ambient Noise Level;
- Water resources, Quality and Drainage; and
- Occupational health and safety.

6.3.1 Impacts during Planning and Construction Phase

The project activities during construction phase include:

- Selective clearing of vegetation in designated areas for Transmission tower erection and RoW;
- Movement of construction machineries, transportation of construction material, tower components, stringing wire etc.;
- Establishment of labour camp;
- Storage of materials;
- Excavation, foundation and construction works;
- Erection of Tower;
- Stringing activities.

Mitigation measures provided for construction activities at site (tower foundation, erection of remaining towers, stringing) are given table as follows.

Table 6.4: Impacts on physical environment and mitigation measures during construction phase

Land use and Land Cover	
Context and receptor	● In the project area, the land is primarily used for agriculture. Other land uses include residential areas, as presented in Table 2.3: ● No major anthropogenic activities are observed in the project area except agricultural activities. ● The project will result in change of the land use within the land parcels where the transmission towers are located. The actual area of land use impact is limited to the footprint (tower base) of the 68 transmission towers which represent around 3.66 hectares for the LILO line. Besides this the land falling under the RoW of transmission line will also

	have limited change in land use in terms of restriction of activities to be undertaken on this area.
Mitigation measure	The land requirement for the tower base has been considered optimum as per the IS standards.
Impact Significance	● A total of 3.66 hectares will experience permanent change in land use. The RoW of transmission line required 546 in forest area where clearance has been obtained and 11504 numbers of trees including fruit & non fruit bearing, bamboos etc. other than forest areas to be felled or pruned. During operation phase, RoW will have limited restriction in terms of prohibiting plantation of any large tree, construction of any structure. The agricultural activities in the RoW area could be continued as earlier. Considering this, the magnitude of the impact is assessed as **medium.** ● Out of total land to undergo permanent land use change is 89.70 hectares are primarily used for agriculture, forest land, crops, residential and range land. Hence, the resource sensitivity is assessed as **medium**. ● As per the Impact Sensitivity Assessment Matrix **(refer Table 6.3)** a combination of medium impact magnitude with medium receptor sensitivity results in impact significance as **moderate.**
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	-
Soil Environment	
Context and receptor	● Digging of foundation pits for the towers may affect the soil quality. ● Foundations shall dig up to a depth of 3-3.5 m depending upon the tower type and soil characteristics. At the tower sites, all vegetation within the footprint of the tower base and additional surrounding area shall be cleared for ground vegetation. Foundation pits shall be backfilled by the excavated soils; ● Compaction of soil during excavation, transportation of construction material & tower components, foundation work, backfilling, tower erection and stringing lead to temporary effects on natural infiltration of rainwater, but these impacts are temporary, localized and marginal; ● Soil contamination at tower locations shall be from result of leaks and spills of oil, lubricants, or fuel from construction equipment. ● General construction waste generated onsite comprised of waste concrete, wooden pallets, steel cuttings / filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminium cans and waste paper shall also be generated by the construction workforce and labour camp site. A small proportion of the waste generated during construction phase shall be hazardous and include used oil, grease and waste oil containing rags. ● During foundation activities at tower locations, excess excavated material shall be generated.
Mitigation measure	● Vegetation clearance and excavation to be done in the marked excavation and construction area only;

	● The excavated soil to be stored on site for back filling; ● Any top soil that is to be removed for construction of tower Footings / foundations to be stored on a designated, bunded area with cover, away from drains and then be used as a (soil) top cover after construction activities are complete; ● After completion of construction activities, site will be cleared for any excess excavated material and leftover construction material. Disposal areas for same will be identified in consultation concerned department; ● Spill management kit will be provided and immediately clean-up of any spillages; ● Provision of waste collection bin and disposal of domestic waste will be provided at labour camp site; ● Tower components and materials shall be placed on stable, level ground with minimal disturbance nearby, thereby reducing disturbance to surrounding standing crop and vegetation; ● The existing roads to be used for approaching tower locations.
Impact Significance	● The impact on soil quality will be limited to transmission tower locations. The land area already disturbed during foundation activities for some tower footing and foundation and shall be continued for remaining tower footing and foundations. ● Compaction of soil may be happened due to vehicular movement for remaining tower footing and foundations, tower erection and stringing activities. However, the compacted soil in surroundings of tower locations will reinstate their original conditions through ploughing activities in fields. ● On basis of this, the magnitude of impact is assessed as **small**. ● The foundation activities at 68 tower locations shall cause disturbance to the fertile top soil in agricultural fields. Considering this, the resource sensitivity is assessed as **medium**. ● As per the impact significant assessment matrix (**refer Table 6.2**) a combination of **small** impact magnitude with **medium** receptor sensitivity results in impact significance as **moderate.**
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Ambient Air Quality	
Context and receptor	● Ambient air quality will largely impact from the following sources during the construction phase: ● Fugitive dust emissions from transportation of material, excavation, drilling, back filling, emission due to movements of vehicles, plying of heavy construction machinery etc.; ● Emissions from diesel generator for construction activities. ● The nearest receptor for dust emissions located outside 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	● All vehicles shall be properly maintained i.e. serviced every 3 months or 5,000 km, ensuring brakes, lights, emissions, and tires are in good condition and vehicle statutory permits also updated as and when necessary.

	● Excavation activities to be avoided during windy weather conditions; ● The unpaved access roads shall be sprinkled with water as necessary to reduce dust, especially during summer windy conditions.
Impact Significance	● The major activities contributing to air emissions, i.e., foundation activities along the transmission line. ● The vehicles and construction machinery plying onsite will generate particulate and gaseous emissions of CO, SO_2, NOx and CO_2. These emissions will be dispersed into the unpolluted environment of the project area. Dust and air emissions resulting from the above activities may affect environment depending upon prevailing wind directions and speed. In addition, fugitive dust emissions generated in the project activities will add to the particulate levels in the project area. Emissions from the DG set and other stationary machines will also generate gaseous emissions. ● Considering above, magnitude of impact is assessed as **medium**. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● There are no ecological sensitivities located in the RoW of transmission line route. ● Hence, the receptor sensitivity is considered as **medium**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with **medium** receptor sensitivity results in impact significance a **moderate**.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Ambient Noise Level	
Context and receptor	● The foundation activities at transmission tower locations will increase the noise level due to operation of concrete mixer, DG set, vehicular movement for transportation of materials. ● During erection of tower and stringing there can be some disturbance from noise due to vehicular movement for transportation of tower components, strings, and communications during erection and stringing. Also, during stringing there will be continuous operation of tractors carrying the strings from one tower to other. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	● Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm); ● Avoid unnecessary honking of horns.
Impact Significance	● In case of transmission line, the noise causing construction activities (drilling, rock breaking and material transportation) at any tower location will be limited to 2-3 days. ● The increase in traffic volumes during the erection of the transmission tower and stringing is expected to be occasional and **negligible**. ● Hence, the magnitude of impact on ambient noise level is assessed as **medium**. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route.

	● There are no ecological sensitivities located in the RoW of transmission line route. ● Hence, the receptor sensitivity is considered as **medium**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with **medium** receptor sensitivity results in impact significance as **moderate**.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Water Resources and Quality	
Context and receptor	● The transmission line generally requires about 50 m^3 of water for casting of foundations for each tower, which shall be sourced from local sources through tankers. ● The transmission line does not pass through River and nallahs etc. **Refer Table 2.3 for details**.
Mitigation measure	● Location of storage area to be avoided on agricultural land and in close proximity i.e. within 50 meters of water bodies wherever possible. ● Excess excavated material not to be dumped in Nallah / water course / drainages. ● Proper arrangement for clean bathing / washing water i.e. provide bathing cubicles with drainage and water supply to be made at labour camps; ● Approved water supply resource to be used for water requirements for concreting and curing during foundation activities; ● Wastewater generated at labour camp will have proper disposal arrangements such as drainage arrangements linked to the septic tanks and soak pits for abating water contamination.
Impact Significance	● The sensitivity of water resource in the area is considered as **low**. ● The magnitude of impact is assessed as small considering the amount of water consumption at foundation activities at tower locations. ● Tower erection and stringing activities does not have water requirement. Further, the direct negative impact on water resources due to construction activities is short term and limited mainly to construction phase of the project. The transmission lines will have insignificant impact on the surface water and ground water. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as **moderate.**
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	The significance of residual impacts for remaining construction activities will be **negligible.**
Drainage	
Context and receptor	● The study area has natural drainage pattern. ● The transmission line does not pass through river and nallahs. Refer **Table 2.3** for details.

Mitigation measure	Drainage system will not be blocked and polluted by the construction activity and shall be closely monitored at Site.
Impact Significance	● The alteration in surface drainage pattern of the area due to construction of transmission line will be insignificant as the natural flow of water will not be altered. ● Considering this, magnitude of impact is assessed as small and resource sensitivity as **low**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with small receptor sensitivity results in impact significance as **low**.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Occupational Health and Safety	
Context and receptor	● The erection of transmission towers, stringing of line will require working at heights. The commissioning of the transmission line will also involve live power lines. ● The working at height has the risks of falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. ● Besides this, there could be slip and trip hazards especially during monsoon season. ● The area experiences heavy rainfall. Working during very heavy rain could cause health hazards. Also working under extreme heat can cause health hazards. ● During tower erection and stringing activities, about 40 workers will be engaged in the LILO Transmission Line.
Mitigation measure	● Trained workers will be involved in the specific work activities such as tower erection and stringing; ● Prior to start of work, workers will be informed about the related safety risks and precautions to be taken; ● Stop work in monsoon season (heavy rains); ● During summer and rainy days with high temperature, work shall be started early in morning with no work during peak temperature in afternoon and rainy days. ● Generally, during hot days works start from 7 am to 11 am and in the afternoon 2.30 to 6.30 pm, with a rest break provided from 11:00 am to 2:30 pm to avoid heat stress. ● Construction areas to be marked and cordoned off; ● Manual lifting by adult men to be less than 55kg and for women it should be less than 30kg; ● Eye protection for welding, cutting or similar operations which may cause hazard to eyes; ● All persons performing construction work to wear safety shoes and helmets confirming to national standard; ● Every worker engaged in handling sharp objects which may cause injury to hand shall be provided with suitable hand gloves; ● A construction worker handling cement and concrete to wear close fitting clothing, gloves, helmet / hard hat, proper foot wear, masks etc. and will take all precaution to keep the cement and concrete away from his skin; ● Moving parts of the hoists, grouting equipment used for concrete work are securely fenced to avoid any injury or unsafe condition; ● The mixing of the concrete is done in such a way that minimum of dust escapes into the air;

	● Erection of steel structures should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc.; ● EPC contractor to ensure a First-aid Box is available at construction site; ● EPC contractor to ensure that health and safety procedures are in place and training on same are provided to the workers prior to construction; ● Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; ● Emergency contact numbers and route to nearest hospital shall be displayed at construction site. ● The local / host community shall be kept at safe distance from construction site.
Impact Significance	● The foundation activities, i.e. tower footing, the erection of transmission towers and stringing will be done through experienced and trained workers. ● Construction of foundation work at transmission towers shall involve local workers who were not having earlier experience. Hence, there will be greater vulnerability for accidents and therefore, receptor vulnerability is assessed as medium. ● Considering the worst-case scenario of an accident, which is a fatality, the magnitude of impact could be **high**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of **small** to **low** impact magnitude with medium receptor sensitivity results in impact significance as **small**.
Additional mitigation measures	● Safety induction training will be conducted on the joining date of the workers. ● Daily toolbox talks will be conducted for the workers before the commencement of any work. ● Refresher safety training, particularly on working at heights will be conducted by the contractor every six months for the workers engaged in the project including workers working at heights. ● A Workers/Labour Grievance Redress Mechanism (GRM) register will be maintained at the project site to address any grievances raised by the workers.
Residual impact significance	The significance of the residual impact after implementation of the recommended mitigation measures will be **minor** for remaining construction activities.

Impact on Sensitive Receptors

Impact on Sensitive Receptors: There are 9 places of worship, 9 Schools, 2 Public health centers, 1 community hall, 1 Forest office, 1 Cemetery, 1 Panchayat office and 1 Library coming within a radius of 500 m from the proposed 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line.

During construction phase, insignificant impact may occur to the above sensitive receptors, as most of the sensitive receptor locations are away from the center line of the transmission lines. Regular noise quality monitoring will be conducted during construction phase and will be compared with base line data. Appropriate measures will be taken if increase in noise level recorded.

6.3.2 Impacts during Operation Phase

The following sub-section provides details on the impacts during operation and maintenance phase. The project activities during operation phase include:

Power Transmission;

Preventive maintenance of Transmission line.

Table 6.5: Impacts on physical environment and mitigation measures during operation phase

Soil Environment	
Context and receptor	**Waste Generation** Any spillage of Aluminum oxide paint during operation and maintenance of the transmission line towers may impact soil quality.
Mitigation measure	Preventive maintenance plan will be prepared for transmission line.
Impact Significance	No impacts of any significance are predicted on vegetation and soil due to operation of the transmission line is small to low.
Additional mitigation measures	Low frequency of painting as well as involving experienced personnel with mitigations like prior spread of sheets underneath the tower structure while painting could be considered.
Residual impact significance	No change in impact significance rating.
Noise Level	
Context and receptor	The likely noise impacts from operation of the transmission line will be due to: ● Maintenance and repair activities; ● 'Corona discharge' from the overhead lines; ● Once operational, noise from energised overhead lines along the transmission line route can be produced by a phenomenon known as 'Corona Discharge' (a limited electrical breakdown of the air). Conductors are designed and constructed to minimise corona effects, although, under certain conditions this can be audible as a 'hissing' sound, sometimes accompanied by a low frequency hum. Conductors designed and constructed to minimise corona effects will be chosen for transmission. It is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area and furthermore, such noises are mostly restricted to rainy weather conditions. ● The nearest receptor for noise emissions located within 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	The project design specifications include the measures to reduce the noise generated along transmission line.
Impact Significance	● The magnitude of noise generation from operational phase will be small but consistent for the entire life of transmission line. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● There are no ecological sensitivities located in the RoW of transmission line route. ● Hence, the receptor sensitivity is considered as **medium**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as **moderate**.
Additional mitigation	No additional mitigation measures suggested.

measures	
Residual impact significance	No change in impact significance rating.
Visual Impacts	
Context and receptor	● The footprint of the project comprise of about 3.66 hectares will experience permanent change in land use and 89.70 hectares respectively for 19.500 km of Sonapur transmission line with 68 towers. ● The transmission line route passes through West Aprikola reserve forest/agriculture/trees/crops/vegetation, residential and range land. The vertical forms of the transmission towers would be prominently visible from the road and nearby settlements. Besides this, the farmers in the field would have clear view of these towers. It is to be noted that the study area already had other existing transmission towers and the new transmission line will be easily absorb in the existing landscape. The visual impacts will be perceived by two types of receptors, namely: ● Receptors located at a fix point, i.e. habitations within the project foot print and area of influence; and ● Receptors who will temporarily come into contact with the transmission line such as passing motorists in the area.
Mitigation measure	The route of alignment had avoided settlement areas, forest areas during project planning.
Impact Significance	● It is important to note that whether the visual impact is seen as positive or negative is highly subjective, and people's attitude towards and perception of the visual impacts associated with the transmission line may differ vastly. The study area already had other existing transmission line. Hence, the magnitude of impact is assessed as **small.** ● Also, the local community does not perceive the transmission line as a new element in the existing visual landscape of the area as interpreted from consultations. Therefore, receptor vulnerability is considered as **low**. ● As per the impact significant assessment matrix (**refer Table 6.3**) a combination of small impact magnitude with low receptor sensitivity results in impact significance as **small.**
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating.
Electro Magnetic Fields (EMF)	
Context and receptor	The power evacuation through the transmission line during operation phase will result in development of electromagnetic fields. There have been some concerns about possible health risk from exposure to electromagnetic radiation from overhead transmission line. People working in the vicinity of transmission line are potentially prone to exposure to EMF. However, while the evidence of adverse health risks is low, it is still sufficient to warrant limited concern.

Mitigation measure	The minimum distance clearance of 8.84 m from ground to the lowest conductor shall be provided in the project as CEA Safety regulations, 2023 which is considered adequate to mitigate potential exposure to electromagnetic fields (EMF). **Details provided in Table 2.3**
Impact Significance	There are no specific standards or guidance on EMF in India however the Indian Electricity Act and Rules clearly stipulate the minimum clearances required. As per ICNIRP standards, the EMF generated by 400 kV line is lesser than the suggested value.
Additional mitigation measures	The recommendations applicable to the management of EMF exposures (as per IFC) as given below shall be followed: ● Evaluation of potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ● Average and peak exposure levels shall remain below the ICNIRP recommendation for General Public Exposure (1). ● If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques will be considered to reduce the EMF produced by power lines, or transformers. Examples of these techniques include: ● Shielding with specific metal alloys; ● Increasing height of transmission towers; ● Modifications to size, spacing, and configuration of conductors; ● During operational phase, AEGCL will monitor the above measures as per requirements.
Residual impact significance	Not Applicable
Occupational Health and Safety	
Context and receptor	● The project will have transmission of 400 kV through the transmission line during operation phase. AEGCL will be responsible for O&M of the Transmission line. ● There is a possibility of lines or towers / tower members falling to the ground, and safety risks during maintenance activities at towers, during the operational phase, contact with the transmission line can result in electrocution. ● Ignorant people trying to tap electricity from high tension wire can lead to fatal accidents.
Mitigation measure	● Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; ● Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. The operational start date for electricity transmission and safety implications will be publicized locally in advance. ● The SOP for preventive maintenance and repairing of fault will be defined and followed. Currently AEGCL has a **Safety Manual on Transmission System** for managing the HSE aspects of existing transmission line operations.
Impact Significance	Based on above, overall impact significance is assessed as **small**.
Additional mitigation measures	● The lock in-lock out system will be followed during maintenance/ repair activities at transmission line; ● Records of incident / accidents shall be maintained; ● Root cause analysis shall be carried out for any incident / accident.
Residual impact	No change in impact significance rating.

significance	

6.4 Impacts on Biological Environment (Biodiversity Assessment, Critical Habitat Assessment Using Tools like KBA/IBA/Avistep etc.)

Impact Assessment Standards defines sensitivity of ecological receptors by determining the significance of effects on species and habitats separately. Impacts during construction and operation phases are presented below.

6.4.1 Impacts during Planning and Construction Phase

The source of impact to biological environment during the construction phase is associated with the clearing of vegetation and the construction activities. As the RoW of the transmission line primarily included agricultural and crop land the impact from clearance of vegetation will be considerably minimum.

Table 6.6: Impacts on biological environment and mitigation measures during Planning and Construction Phase

Impacts due to Vegetation Clearance	
Context and receptor	● Vegetation clearance is the first step in the establishment of access / internal roads and excavation for the erection of tower footing and transmission tower foundations and ancillary facilities. Impact of vegetation clearance could happen at the time of line stringing at few places. ● Most commonly found species within the transmission line corridor are crops like rice, jowar, arhar, tur, moong, til, groundnut, soyabean, chilly and, ginger, onion, chilly, brinjal, bhindi, wheat, gram, mustard, turmeric, potato, carrot, pea. ● Ground clearance will be maintained from the lowest cable and any object that is grounded (tree etc.). ● Clearing of vegetation from agriculture / crops, trees / vegetation, built up area reduces options for nesting habitat for birds, shelter from predators, foraging resources, shade, perching habitat and breeding sites. The loss of vegetation can also have a negative effect on soil quality and hamper survival of neighboring floral species, burrowing faunal species and foraging resources for herbivores in the area.
Mitigation measure	In tower foundation location and transmission line corridor no mature fruiting tree or any other tree that is important for community will be felled. The tower locations will be adjusted to avoid mature trees that are important for the community. In case it is absolutely necessary, chopping and trimming of the branches will be undertaken.
Impact Significance	● Construction of towers and stringing of transmission lines may lead to chopping / trimming or clearing of tree species. This may also happen (or already happened) during line stringing. ● In addition, vegetation clearance may remove few shrub and herb species. Vegetation clearance will lead to habitat disturbance for fauna. ● The clearance of vegetation in agriculture / crops, trees / vegetation, built up, habitat is expected to occur at a scale to have an impact on habitat for species (birds, mammals and some reptiles) that utilize those resources. ● Vegetation is small enough and construction activities that will disrupt connectivity of habitats for species utilizing the area. However, there is substantial habitat for these species in the region and any impact that likely to happen is unlikely to cause loss of habitat viability and function in the region. The loss of habitat in the agricultural land pertains to any areas that provide connectivity to water bodies and vegetation patches.

	● Once again agriculture / crops, trees / vegetation, built up is widespread in the region and therefore impacts from vegetation clearance for construction of transmission line that expected to happen is not expected to cause any long-term disruption of habitat viability and function. ● Impact magnitude is thereby considered small. The sensitivity of these habitats is considered low as they may have some significance for IUCN Least Concern Species alone and are common. ● The species dependent on agriculture / crops, trees / vegetation, built up, habitats are included within the Least Concern category. However, the site has bird species protected under IUCN conservation; therefore the site has been deemed to have medium sensitivity. The impacts described above are not expected to cause a significant change in the population of these species and therefore the impact magnitude has been deemed small. ● The overall impact significance has been assessed as not significant for habitats and minor for species.
Additional mitigation measures	● The following mitigation measures will further reduce the impact significance on the habitat and species for the remaining construction works that require vegetation clearance: ● Vegetation disturbance and clearance should be restricted to the project activity area; ● Strict prohibition should be maintained on use of fuel wood and shrubs from nearby areas as kitchen fuel. ● **No labour camp shall be established on the forest land.** ● **User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas.** ● **No damage to the flora and fauna of the adjoining area shall be caused.** ● **The User Agency at its cost shall provide bird deflectors, which are to be fixed on upper conductor of transmission line at suitable intervals to avoid bird hits.** ● **All the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.** ● The forest land shall not be used for any purpose other than that specified in the project proposal.
Residual impact significance	Removal of vegetation can have a direct and indirect impact on the local ecology. While the impact is limited to the relatively short construction phase of the project, the recovery time to return to pre-project conditions is long and therefore the significance of the residual impacts will remain **minor** for species.
Impacts due to Construction Activities	
Context and receptor	● Construction activities include excavation, movement of machineries, increased anthropogenic movement (men and transport) in the project study area. These activities are assessed with respect to disturbance of habitats and species. ● Excavation for the construction of the foundations for transmission towers and ancillary facilities shall have direct impact on burrowing fauna, mammalian fauna and an indirect

	impact on flora / fauna through the changing of soil properties. This type of impact could happen for each tower footing that is yet to be constructed. ● Anthropogenic movement will result in increased stress placed on fauna in the area that remain alert for an extended period of time and may prevent proper breeding, nesting, mating, socializing and foraging. ● Noise from anthropogenic movement (men and transport) for the construction activities shall cause disturbance to fauna in the nearby areas. ● This type of impact could happen during the remaining footprint and tower foundation stringing activities of the transmission line.
Mitigation measure	In-house training provided to the labour force and supervisory staff for situations dealing with wildlife encounters.
Impact Significance	● The significance of impacts from construction activities is being assessed for agriculture / crops, trees / vegetation, built up for faunal species. ● Excavation activities have the potential to cause detrimental impact on the soil properties in the area and on burrowing species, neighbouring flora, herbivores and small carnivores. ● Burrowing animals including reptiles and ground-roosting bird species and lizard burrowing holes can be directly affected by excavation. ● Mammalian species could fall in the ditch constructed for the remaining tower footings and get injured. ● Anthropogenic movement could create increased stress on mammals, birds and reptiles in the project study area in proximity to the areas tower construction and stringing activities are proposed. Mammal species are also susceptible to higher noise levels from anthropogenic movement and construction due to their better auditory perception. Noise can affect mating and breeding behaviour in all species that utilize sound to communicate with one another and find suitable mates. ● Impact magnitude is considered **small.** The sensitivity of these habitats is considered **low** as they may have significance as per IUCN Least Concern Species alone and are common. ● The species dependent on agriculture / crops, trees / vegetation, built up and range land habitats (reptiles, birds and mammals) are included within the Least Concern category. ● However, the site has bird species protected under IUCN Conservation Status and therefore the site has been deemed to have **medium** sensitivity. The impacts described above are not expected to cause a significant change in the population of these species and therefore the impact magnitude has been deemed **small**. ● The overall impact significance has been assessed as **not significant** for habitat and **minor** for species**.**
Additional mitigation measures	The following mitigation measures will further reduce the impact significance on the species for the remaining construction works: ● Construction and transportation activities should be avoided at night (6:00 pm to 6:00 am); ● Temporary barriers with wire mesh should be installed on excavated areas to prevent falling of mammalian species; ● Good i.e. regularly on daily basis the housekeeping should be followed for construction activities; ● Anti-poaching, trapping and hunting policy among employees and contractors should be strictly enforced; and ● General awareness regarding fauna should be enhanced through trainings, posters, etc. among the staff and labourers.

Residual impact significance	The implementation of suggested mitigation measures can significantly reduce the impacts from construction activities but there will still be some impacts due to noise and anthropogenic movement. The residual impacts for species will remain **minor**. However, as impacts of construction activity will be reduced there will continue to be disturbance to fauna and flora will be reduced.
Habitats of Critically Endangered and Endangered species	
Context and receptor	**Key Biodiversity Areas within 10 km radius:** An analysis for Key Biodiversity Areas (KBA) within 10 Km buffer from the center line of the LILO line were assessed by obtaining data from the World Database of Key Biodiversity Areas and it is found that critical wildlife habitat i.e., KBA Site Amchang Wildlife Sanctuary is present within 10 KM buffer of the 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line. However, the construction of the proposed Right of Way of the transmission line does not involve any Critical wildlife habitat. A map showing the project area vis-a-vis location of Critical Wildlife Habitat is already shown in **Figure 4.1** of this report. The faunal assessment of the project area reveals presence of common domesticated fauna only like Cow, buffalo, goat, pig, dog etc. Also, common species of birds and other mammals are found. As per the site assessment and public consultation, presence of wildlife species is very rare but the possibility of occasional presence of some wildlife species like fox, monkeys etc. in the vicinity of project area cannot be entirely ruled out. A brief ecological assessment of the proposed transmission line with respect to nearest Eco-sensitive areas is conducted and placed at **Appendix- 17 & 18**.
Mitigation measure	Adoption of general mitigation measures like awareness program for the construction workers, planning of construction work, adoption of safety measures is envisaged and will be sufficient. In-house training is to be provided to the labour force and supervisory staff for situations dealing with wildlife encounters.
Impact Significance	Based on above, overall impact significance is assessed as Small.
Additional mitigation measures	No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work.
Residual impact significance	No change in impact significance rating.

6.4.2 Impacts during Operation Phase

The source of ecological impacts in the operation phase is associated with electrical and collision hazards from transmission infrastructure. The impacts in the operation phase are considerably larger due to the presence of other transmission lines in the area that multiply the hazards for flying bird species.

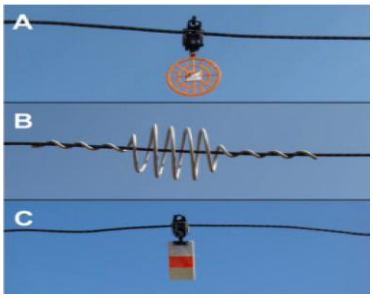
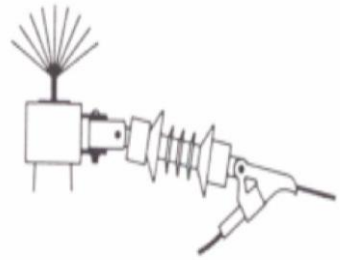
Impacts from the operation phase of the project on the local ecology have been assessed with respect to the following activities:

Perching on transmission lines and towers and flying in proximity to the conductors for avifauna.

Based on the facts that minimum clearance between conductor and trees ranges from 4 to 5.5 m; minimum ground clearance as per Electrical standard is 6.1 to 8.44 m and Spacing between the lines/cables is 3.05 to

5.49 m, it can be assumed that, electrocution of primate/monkey and bird's wingspan has not been anticipated by touching two cables.

Table 6.7: Impacts on biological environment and mitigation measures during Operation Phase

Collision and Electrical hazards for avifaunal species	
Context and receptor	● During the ecological assessment bird species were found roosting on wires and poles in the area. Some birds also utilize the transmission towers for nesting by placing the nests across wires or using holes in the tower itself. Collision of birds can happen with transmission line due to specific behaviours like courtship displays, aerial hunting as they may distract the birds from the presence of the power lines. ● The distance between the Amchang Hills KBA from the Transmission Line project is around 5.5 Kms. ● Details of AVISTEP analysis provided in appendix-9. ● No Bird flyways cross the T/L route. ● Collision may happen for birds that make regular and repeated flights between roosting and feeding areas in proximity to power lines. ● Stretch nearby the water bodies is vulnerable to bird collision. Avifaunal species forages nearby in and around the river for their daily needs.
Mitigation measure	The following mitigation measures will reduce the impact significance on avifaunal species: ● Installing perch rejecter (Upright "whisk brooms" - Picture 4) on the cross arms (Picture 1). ● In order to mitigate and minimize collision of birds, power line markers should be used (Picture 2), which reduce the risk by increasing the visibility of overhead lines to birds (Sporer et al. 2013). These items are included in Sl. No. 7 of BOQ. Total 45 nos. of above mention items will be used for the LILO line as per site requirement. ***Electrical Pole Modification***  Picture 1: Power line markers*  Picture 2: Perch Rejecter
Impact Significance	During the ecological assessment bird species were found roosting on wires and poles in the area. In addition, birds may collide when moving across water bodies in the study area. Some birds with large wing span may get electrocuted. However, it is unlikely that mortality from collision/electrocution will cause any changes in the population regionally. Moreover, appropriate mitigation measures will be implemented to address any potential **negative** impacts on Avifauna. The impact magnitude has been assessed as small. Furthermore, impact significance to species is considered **moderate**.
Additional mitigation measures	No additional mitigation measures suggested.

Residual impact significance	After implementation of mitigation measures, the significance of residual impacts will be **moderate**. We retain this significance, as while the mitigation measures are likely to reduce the impact, the probability of electrocution still cannot be ruled out.
Critical habitats of Critically Endangered and Endangered species (AVIFAUNA)	
Context and receptor	AVISTEP as the Avian Sensitivity Tool for Energy Planning has been used for the project area to 1. Identify areas of high avian sensitivity across landscapes where power infrastructure like transmission lines is proposed. 2. Minimize impacts on bird habitats and migratory paths during planning and route alignment. 3. Support environmentally responsible decision-making in the energy sector. 4. Promote biodiversity conservation while allowing energy infrastructure development. The AVISTEP analysis is based on spatial data such as: Important Bird Areas (IBAs), Migratory corridors, Wetlands, forests, and other ecologically sensitive zones of the area. Detail of Avifauna species with respect to their collision sensitivity & occurrence certainty in the project area as per AVISTEP analysis is provided in **Appendix – 9.** Important bird species inhabit the Amchang Hills KBA and there is a risk of collision with the T/L conductors for which necessary mitigation measures provided in table 6.7. Further a proximity analysis of IBA sites with regards to project area also concludes that any IBA sites are not present in the buffer of 10 KM radious from 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line. The nearest KBA site i.e., Amchang Wildlife Sanctuary is at an offset of approx. 800 m from the transmission line. (Map showing the nearest IBA sites from the project area and detail of IBA sites of Assam is enclosed for reference in **Appendix- 11 & 12** respectively.
Mitigation measure	In order to mitigate and minimize collision of birds, power line markers will be used at selected section of the transmission line in proximity to birds flying routs, water bodies as per site assessment, which will reduce the risk by increasing the visibility of overhead lines to birds. A specific monitoring requirement in the form of wildlife monitoring checklist for LILO operator to regularly monitor/observe and record bird collisions and deaths along the transmission line ROW. The bird/wildlife monitoring is to be regularly reported to the PMU and the AIIB. **Checklist provided in Appendix – 7**.
Impact Significance	Based on above, overall impact significance is assessed as **moderate**.
Additional mitigation measures	Adoption of general mitigation measures like awareness program for the construction workers, prohibition order for bird hunting in the project site, planning of construction work etc. are envisaged and will be sufficient. Further below mentioned mitigation/management measures will be followed. ● **No labour camp shall be established on the forest land.** ● **User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas.** ● **No damage to the flora and fauna of the adjoining area shall be caused.** ● **The User Agency at its cost shall provide bird deflectors, which are to be fixed on upper conductor of transmission line at suitable intervals to avoid bird hits.**

	• **All the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.** • **The forest land shall not be used for any purpose other than that specified in the project proposal.**
Residual impact significance	No change in impact significance rating.

6.4.3 Cumulative Impact for Avifauna

The cumulative impacts to the avifauna species are considered as **moderate** since there is a possibility of impact to the globally threatened migratory avifaunal species.

6.5 Impacts on Social Environment

6.5.1 Impacts during Planning and Construction Phase

Table 6.8: Impacts on social environment and mitigation measures during Planning and Construction Phase

Economic loss to private landowners in the tower base area and beneath the conductors due to crop damage during civil construction and stringing activities.	
Context and receptor	For 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line is spread across ten villages namely - Moupur, Luri, Lofar, Nartap, Barkachi, Dhemai, Bhakuagog, Burni, Sonapur, Sonapur Pathar under Sonapur Tehsil in Kamrup (Metro) District. No physical displacement or loss of residential structures is anticipated for any private landowner, as confirmed during the check survey. However, project activities may result in economic displacement resulting from crop loss due to foundation and tower erection works, temporary access road creation and transmission line stringing. The joint verification for identification of landowners for proposed LILO transmission line for tower footing area has been completed by concerned revenue Circle. Compensation will be provided to affected landowners after the approval of the Land Scheduling Report from concerned District Authority and before commencement of works. Land is not acquired for the project as per Electricity Act of 2003, and ownership remains with the landowners. However, there will be permanent restriction of land use for tower footings area. Agricultural activities may continue in the RoW area post-construction, except at tower base locations, where farming is discouraged due to electrical safety concern.
Embedded / in built measures	The crop compensation value will be based on the crop damaged at the time of the tower foundation work and stringing activity. The compensation shall be paid based on the rate provided by the concerned department as determined by the agriculture, horticulture & forest department etc. based on the market value and as per the entitlement matrix of Resettlement Action Plan (A/RAP) prepared for the Project. The assessment for the loss of crops and trees shall be done jointly by concerned line department, Circle Offices, AEGCL, PMC and EPC contractor in presence of the

	affected land owners for payment of compensation.
Impact Significance	The construction activities along the tower base are anticipated to result in a one-time loss of crops. Even though most of the construction activity has been planned during the dry season, there may be instances where the construction of the transmission tower foundation, erection of towers, and subsequent stringing of transmission line involve movement of men, machinery, and equipment across agricultural fields leading to the tower locations. This movement could potentially damage standing crops, not only at the tower base and Right of Way (RoW) of the transmission line but also in adjacent agricultural plots. This damage would lead to temporary income loss for the cultivators. There will be no physical displacement or loss of residential structures for any private landowners, and no impact is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs), or archaeological/historical sites, as assessed during the check survey. However, there are schools, places of worship, community hall, forest office, cemetery, public health center, panchayat office and a library located beyond the RoW. The overall impact on land holdings in the RoW can be ascertained after conducting a socio-economic census survey, which will be carried based on approved check survey report. Since most of the community members and villagers primarily depend on agriculture as a source of livelihood, the impact significance is considered **moderate**.
Additional mitigation measures	Utmost care will be taken to avoid crop damage and the construction activity will be carried-out during lean season. In addition to this, an Abbreviated/ Resettlement Action Plan (A/RAP) has been prepared for the transmission line route in keeping with applicable reference of Environmental and Social Management Planning Framework (ESMPF) requirements. In addition, compensation will be paid to affected households and individuals before commencement of work. A GRM shall also be established for affected people to raise any related concern.
Residual impact significance	The residual impact significance of the impact on private land owners in Tower Base Area and below conductors during Stringing Exercise is anticipated as **moderate.**
Economic Loss to private land owners within RoW due to imposition of land use restrictions	
Context and receptor	The economic loss to private land owners within the RoW can be determined after conducting the socio-economic Census survey, which will be carried out based on approved check survey report. The alignment will mostly pass through agricultural land, forest land, resulting in the loss of areas used for paddy (rice) cultivation and tea. In keeping with these that the MoP guidelines as well as Government of Assam Notification on land compensation for tower footing and RoW Corridor on 10th March 2017 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024 for payment of compensation for land within the RoW and the base area have been introduced. These guidelines were formulated based on a report submitted by a committee headed by the special Secretary of the Union Power Ministry. This report noted the resistance being posed by land owners and farmers to the construction of

	transmission lines, demanding higher compensation owing to the diminution of land value below towers and under the corridor.
Embedded/ in built measures	Compensation for RoW area will be paid to the individual land owners as per compensation procedures and in line with Project RAP. Further, in line with the guidelines of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024. which stipulates compensation of 200% for tower footing area and 30% for RoW
Impact Significance	The land within the Right of Way (RoW) is currently used primarily for agriculture, with crop heights not affecting safety clearance, allowing continued cultivation. While some road-facing plots have potential for future non-agricultural use, restrictions on land-use will have a lasting impact on such conversions. However, these areas were largely avoided during the check survey, and as a result, the overall impact is considered **minor.**
Additional mitigation measures	Regular consultation with affected landowners to clarify permissible land-use activities within the RoW. Provision of guidance and awareness to farmers regarding safe cropping practices under transmission lines. Ensuring timely compensation for any temporary damages during construction or maintenance activities.
Residual impact significance	The residual impact significance of the impact on private land owners within RoW due to imposition of land use restrictions is assessed as **negligible.**
Impact on Community Health and Safety	
Context and receptor	The receptors for impacts on community health and safety include project site workers, settlements in the close proximity of the project site, which will be exposed to health impacts from the project activities. The construction phase activities such as construction of transmission lines and movement of material and personnel may result in impacts on the health and safety of the community. As mentioned earlier in the report, the transmission line will pass through villages and will thus lead to significant impact on community health and safety during construction phase. Construction activities will involve the use of heavy machinery and live transmission power lines. Furthermore, the movement of material and personnel via the access roads may result in damage to human life or livestock due to accidents. The major community health and safety risks include structural failure of project infrastructure, life and fire safety, public accessibility and management of emergency situations. Based on the above analysis, the impact magnitude is assessed to be **medium**. Moreover, the potential for GBV/SEA/SH increases due to the presence of migrant male workers, especially in areas where there is close proximity between workers and local women and girls. Limited access to legal, health, and social services further heightens the vulnerability of affected populations. Additionally, social stigma and a lack of awareness regarding GBV-related issues contribute to underreporting and inadequate response mechanisms."
Mitigation measures implemented	The provisions for safety of the workers will be complied as per the provision of the EPC contractor agreement. The Contractor should conduct continuous awareness raising and training activities to ensure that workers abide by the Code of Conduct. Moreover, the Code of Conduct should be in local language (Assamese) and signed by each workers/labour. **The format for CoC is appended at Appendix-10.** The

	establishment of a Grievance Redress Mechanism (GRM) will also include provisions to address grievances related to Gender-Based Violence (GBV) sensitively and confidentially.
Impact Significance	The impact to community health and safety during the construction phase is evaluated to be of minor to moderate significance due to proximity of the TL line passing through different villages. However, the significance of impact decreases because the project site consists of medium density of population and most of the unskilled labour will be engaged from the local habitation.
Additional mitigation measures	Provide awareness meeting for local communities on construction-related risks and safety precautions. Maintain adequate fencing and barricading around work fronts to prevent accidental entry of villagers, especially children. Ensure dust suppression measures (regular water sprinkling) during construction activities near habitations. Regularly monitor health and safety incidents and report compliance to the Project Management Unit (PMU).
Residual impact significance	After the implementation of the additional mitigation measures, the impact significance is expected to become **negligible**.
Impact on Economy and Employment in the Study Area	
Context and receptor	The construction phase of the project resulted in the creation of employment and economic opportunities for the local community. These economic opportunities comprised of the following: ● Engagement of the local community as labourers in the project; ● Contracting opportunities for locals possessing tractors, dumper trucks or other vehicles which would be needed to carry away excavated soil and other material. ● Creation of indirect employment for local community through establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.
Mitigation measures implemented/observed on site	It is foreseen that the contractor would give preference for unskilled/semi-skilled workers from the local community. It is anticipated that around 90% of workers during the foundation activities would be locally hired workers.
Impact Significance	The overall impact significance of the impact on economy and employment during the construction phase is assessed as **positive.**
Impacts Due to Migrant Labour	
Context and receptor	As anticipated, the unskilled labourers may be recruited from the local villages, while the semi-skilled and skilled labourers may be hired from other districts of Assam. The labour camps shall be setup nearby the tower foundation work. These camps shall be set up by the contractors. The laborers shall be engaged from similar cultural background which reduces the chances of conflicting cultural values with host population and are benefiting the small business owners in the villages as customers.
Mitigation measures implemented	The EPC contractor engaged for the project is responsible for ensuring adequate accommodation facilities for the labourers. The key requirements of the ESMP in terms of the labour accommodation are as follows: ● Contractor shall provide necessary water supply, sanitation, drainage and medical health facilities at campsite.

	● Contractor shall provide PPE such as safety goggles, helmets, safety belts, ear plugs, mask etc. to staff, workers and laborers. ● Reverse horn for all construction equipment and vehicles should be kept in working order. ● Required electrical safety measures such as double earthing for heavy electrical equipment, machinery, providing earth link circuit breaker (ELCB) for all electrical connections shall be undertaken by the contractor. ● The contractor shall comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. ● The contractor shall also ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint. ● Contractor shall provide facemasks to the workers when paint is applied in the form of spray or a surface having dry lead paint is rubbed and scrapped. ● The Contractor shall mark 'hard hat' and 'no smoking' and other 'high risk' areas and enforce non-compliance of use of PPE with zero tolerance. ● Maintaining first aid at construction sites. ● Maintaining emergency response system. ● Provision of waste collection and segregation with two bins systems (bio-degradable and non-bio degradable) and encourage labours to use the same; ● Waste disposal- identifies existing locations for waste disposal in the area or creates safe disposal pits for biodegradable waste. Non-biodegradable waste shall be stored and disposed to nearest Municipal waste disposal facility.
Impact Significance	As this impact is restricted to the construction phase and the proportion of workers population is anticipated to be minimum, the impact magnitude is assessed as small. The labour camps shall usually be established in close vicinity of the village settlements; the sensitivity of the local community is assessed as low. As per the impact significant assessment matrix a combination of small impact magnitude with low receptor sensitivity results in impact significance as **negligible.**
Additional mitigation measures	The following additional mitigation measures would be taken to mitigate the negative impacts due to migrant labour: ● The monitoring should be undertaken adequately to ensure the contractor's ● Compliance to the applicable rules and regulations and provisions as per the contractual agreement with EPC contractor. ● The implementation of the GBV CoC for all workers ● The health checkup for the migrant workers would be done before starting of construction activities, ● The grievance redressal mechanism for the project can be access by the local community and labourers and can receive GBV related cases.
Residual impact significance	The residual impact significance will remain **negligible**

6.5.2 Impacts during Operations Phase

Table 6.9: Impacts on social environment and mitigation measures during Operation Phase

Impacts of economic loss due to damage to standing crops during Maintenance work	
Context and receptor	During the operations phase, it is anticipated that it may loss the crop and tree due to the following: ● Due to movement of personnel and machinery for maintenance activities it may loss the crop. ● Trimming of trees and vegetation in the RoW.
Planned / Implemented Mitigation Measures	The compensation for the impacts of crop loss will be paid in keeping with the Electricity act, 2003 and Government of Assam Notification on 10th March 2017 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) MoP new guideline March 2025 & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024 and according to entitlement matrix in the RAP. The assessment of loss will be done in the presence of the land owners. Further details regarding the application of this Act and the compensation amounts provided to the affected landowners will be included in the updated ARAP/RAP report.
Impact Significance	As the impact of maintenance activities along the RoW are expected to be limited and there is possibility of crop loss during emergencies or major repairing work. However, since the community is primarily dependent upon agriculture as a source of livelihood, the sensitivity is assessed as Medium. As per the impact a combination of small impact magnitude with medium receptor sensitivity results in impact significance as **medium** to **moderate.**
Additional mitigation measures	Provide advance notice to farmers and landowners prior to undertaking scheduled maintenance activities. Ensure timely and adequate compensation for any crop loss or damages caused during emergency or major repair works.
Residual impact significance	With the proposed mitigation measures, including advance notice, compensation for crop loss, and a grievance mechanism, the adverse effects on agricultural livelihoods are expected to be minimal. Therefore, the residual impact is assessed as **Minor**.
Impact on Community Health and Safety	
Context and receptor	The impacts on community health and safety during the operations phase are likely to result from: ● Movement of traffic and machinery for maintenance; ● Tower falling; ● Wire snapping; ● Exposure to herbicide/pesticides used for maintenance of RoW; ● Electro-Motive Force (EMF) generation and electromagnetic interference; ● Electrocution The above-mentioned impacts are likely to be restricted to those using the land within the RoW.

Planned /Implemented Mitigation Measures	● Conduct public awareness and education and physical measures the risks will be reduce during operation and also by attaching an appropriate warning sign on all faces of the tower; ● Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. ● The operational start date for electricity transmission and safety implications will be publicized locally in advance.
Impact Significance	There may be impact which is anticipated in the receptors within the RoW is small to low.
Additional mitigation measures	The following additional mitigation measures have been identified for reducing the impacts on community health and safety: ● Undertaking health awareness among the local community focused on aspects such as electrical safety, risks of climbing the towers, do's and don'ts in case of wire snapping or tower collapse etc. ● Undertaken awareness campaigns in the school regarding the hazards from the Transmission lines and the do's and don'ts in case of any emergencies. ● Access of the local community to the grievance redressal mechanism established by the project.
Residual impact significance	After the implementation of the additional mitigation measures, the impact significance is expected to be reduced to **negligible**.

6.6 Summary of Impact Assessment

Table 6.10: Summary of Impacts

Category	Impact Significance (Without mitigation measures)	Significance (post-mitigation)
Construction Phase Impact		
Land use and Land cover	Medium	Moderate
Soil environment	Medium	Moderate
Water resources and quality	Medium	Moderate
Drainage	Small	Low
Ambient air quality	Medium	Moderate
Ambient noise level	Medium	Moderate
Occupational health and safety	Small	Low
Flora and fauna- vegetation Clearance	Small	Low
Flora and fauna- Construction Activities	Small	Low
Impact on critical wildlife habitat	Small	Low
Impact on Private Land owners in Tower Base Area and below conductors during Stringing Exercise	Medium	Moderate
Impact on private land owners within RoW due to imposition of land use restrictions	Small	Low
Impact on local community due to loss of grazing land for Grid Sub-station	Small	Low
Impacts Due to Migrant Labour	Small	Low
Impact on Community Health and Safety	Small	Low

Category	Impact Significance (Without mitigation measures)	Significance (post-mitigation)
Impact on Economy and Employment in the Study Area	Small	Low
Operation Phase		
Soil Environment	Small	Low
Noise level	Medium	Moderate
Visual Impacts	Small	Low
Electro-magnetic fields	No change in impact significance rating	
Health and safety	Small	Low
Flora and fauna- Collision and Electrical hazards for avifaunal species	Medium	Moderate
Impacts of economic loss due to damage to standing crops during Maintenance work	Medium	Moderate
Impact on Community Health and Safety	Small	Low

6.7 Overall cumulative and induced impacts of the project

Overall cumulative impacts are the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects.

Induced impacts

Induced impacts refer to the broader effects that occur as a result of the transmission line project itself, which may not be immediately apparent but can unfold over time. These can include both positive and negative consequences that extend beyond the immediate scope of the project.

a. Environmental Induced Impacts

Land Use Changes: Establishment the transmission line may stimulate land use changes, including agricultural intensification, urban sprawl, or industrial development, which can increase pressure on local ecosystems.

Climate Change Effects: The transmission of electricity might enable greater reliance on energy-intensive industries or projects, leading to increased emissions over time, either directly or indirectly.

Pollution from Indirect Sources: As energy supply increases, it may attract more polluting industries (such as mining, manufacturing, or chemical production), leading to higher levels of industrial waste, air emissions, and water contamination.

b. Social and Economic Induced Impacts

Economic Growth and Job Creation:

During the construction phase, the project will generate short-term employment opportunities for skilled and unskilled labor and may stimulate demand for local goods and services. Over the longer term, improved electricity infrastructure may facilitate increased investment and business activity. However, these

economic benefits are likely to be indirect and unevenly distributed, and may not accrue equally to all segments of the local community. Mainly, the project is expected to contribute to economic development primarily through improved power transmission reliability and grid stability, which can support industrial, commercial, and service-sector activities in the wider region.

Improved Access to Energy: The improved electricity infrastructure could indirectly promote local development, including better access to education, healthcare, and other services, enhancing overall quality of life.

Increased Traffic and Transportation Demands: The increased demand for goods, services, and workforce associated with the project may lead to higher traffic volumes, road wear, and congestion, impacting local transportation networks and road safety.

7 CLIMATE RISK AND ADAPTATION AT THE DESIGN STAGE

Following are the few climatic parameters along with remedial measures adapted for Transmission Line at design stage.

7.1 Temperature Rise

Climate Risk: Conductors elongate due to the increase in temperature which results in the reduction of ground clearance of transmission lines. This typically intensifies the risk of flashovers.

Adaption: By using higher rated conductors HTLS, this sagging affect of transmission lines can be reduced. Conductors made of material that can operate at higher temperatures yet causes lower sag (high temperature low sag or HTLS) may need to be specified at the project design. Strengthening of the towers, tower footings, conductors for extreme heat events, protective coatings to reduce dust deposits on insulators.

ACSR / AAAC conductor for new proposed lines, it's economical than HTLS.

7.2 High Winds and Storms

Climate Risk: High winds and storms can cause mechanical damage to overhead lines, towers, and poles etc. directly and by blowing debris against exposed grid system components indirectly. In transmission lines, high winds may lead to flashovers caused by live cables galloping and thus touching or getting too close to each other. Strong winds can blow trees over overhead lines and short circuit lower lying distribution grid system cables.

Adaption: Designing transmission towers to withstand the highest projected wind loadings, more frequently inspecting and maintaining their integrity, rerouting lines alongside roads or across open fields, more frequently and drastically trimming trees, and more effectively forecasting storms and hurricanes are examples of a wide range of already established adaptation options that may need to be increasingly used in the future.

As per latest Indian standard IS802-2015 (part1/sec1) the following changes will resolve tower failure from old code design. Such as:

1. Drag co-efficient for evaluating wind load on towers have been stipulated for different sections & the change in Drag Co-efficient for different solidity ratios.
2. Load combination for sag tension of conductor and ground wire / optical ground wire (OPGW) and for climate loads have been modified.
3. Narrow Front wind to be considered for Suspension tower.
4. For suspension tower, the loading condition also updated as 75% EDT wind to consider for wire loading calculation.
5. In Addition, the Wire loading also included additional load cases with angle of wind direction in 0, 30, 45 Deg.
6. Material requirement for bolts and nuts have been modified.
7. Tower should be tested as per provisions of relevant Indian standard and observed until the specified waiting period is over.

However, the above changes will affect the design margin and objectives are to optimization in Tower design.

7.3 Thunder & Lightning Risk

Climate Risk: Thunder and lightning can cause transmission lines to trip and become temporarily unavailable for operation. The extremely high voltages of a lightning impulse can result in short circuits which can lead to permanent damage of conductors, insulators and the structures.

Lightning close to or directly on-line conductor's produces ionized gases that can cause a short circuit fault as the electrical protection disconnects the affected circuit. Such flashover faults may increase in many regions owing to greater lightning frequency.

Adaption: Vulnerability can be reduced by adding earth and fitting spark gaps and surge arresters.

A lightning arrester is placed where wires enter a structure, preventing damage to transmission lines within and ensuring the safety of individuals near them. Lightning arresters, also called surge protectors, are devices that are connected between each electrical conductor in a power system, and the Earth. They prevent the flow of the normal power or signal currents to ground, but provide a path over which high-voltage lightning current flows, by passing the connected equipment. Their purpose is to limit the rise in voltage when a communications or power line is struck by lightning or is near to a lightning strike.

7.4 High Temperatures

Climate Risk: Losses in transmission efficiency due to gradual warming are relatively small compared with the physical and monetary damage to power transmission networks that can be caused by hot weather conditions. Transmission losses increase far beyond the level caused by the higher average temperatures.

Expanding cables might trigger flashover to trees underneath, and extreme high temperatures can make lines and transformers overheat and trip off. Adaptation can include a mix of measures like enhancing system capacity, increasing the tension in the line to reduce sag and adding external coolers to transformer.

7.5 Flooding

Climate Risk: Flooding caused by heavy rains and storm, rerouting lines across less exposed regions is another option to consider. Increasing heavy rain may cause flashover faults across high voltage insulators and short circuits in high voltage circuit breakers. The intensity of the flash flood is enough to wash away the foundations of the collapsed tower.

Adaptation: Rerouting of line will increase line length and pile foundation cannot be avoided in the alternate route.

The improved design of insulators, careful siting and enhanced maintenance can mitigate vulnerability to these impacts. Surges would damage equipment at ground level. Improving insulator design, sitting ground installations outside hazard zones and reinforcing supporting elements can help reduce these impacts.

Pile type foundations may be considered for towers in flood prone areas based on soil investigation reports and latest high flood data.

By Providing Proper Revetment and use of geo-synthetic material in foundation, concrete encasing and painting of stub in water logging areas etc. may also be considered, wherever required.

Coping of chimneys of tower foundation, wherever required, should be taken up to avoid rusting of stubs.

The power transmission design of individual components has changed but the materials of construction remained virtually the same. Thus, by using steel and cast iron (bare, painted or galvanized), aluminum alloys and copper alloys. To enhance the corrosion resistance of these materials various treatments, coatings and inhibitors are applied which enhance the life of the transmission lines.

7.6 Drought

Climate Risk: Drought conditions are particularly risky when vegetation close to overhead lines dries out. The dry undergrowth can be ignited by flashover if it comes into contact with line conductors. Ionized air in the resulting smoke and combustion particles may turn into an electricity conductor that would cause multiple luminous electrical discharges (arcs) on the overhead line.

Forest or bush fire caused by drought can also damage overhead lines directly by damaging conductors and insulators and by burning wood poles.

Adaptation: Trimming back vegetation to a safe distance within and along the borders of transmission corridors is the most obvious way to reduce vulnerability to this type of weather hazard. Depending on regional circumstances, routing transmission lines to areas without high growing flora may also need to be considered.

7.7 Landslides

Climate Risk: The failure of towers might have been caused by the landslides triggered by continuous rain for few weeks. The landslide might have caused the complete sliding away of the supporting soil which might have caused the deformation in tower.

Adaptation: To explore the possibility of Proper Drainage and protection work / retaining wall for foundation of towers in hilly terrain to avoid such incidences.

7.8 Earthquakes

Based on international journal reference, the behaviour of steel transmission tower at the action of seismic load and wind load is studied by conducting large deformation and elasto-plastic analysis.

For the analysis, the earthquake parameters taken. Based on the analysis, it is reported that the maximum displacement of the tower in seismic analysis and there will be no buckling in the main leg members while compared to that of the wind response analysis.

Analysed the behaviour of transmission line towers through the non-linear time history analysis of transmission towers on sloped ground has been carried out for different height, bracing system and also with the provision of base isolators using SAP2000(software).

From this analysis report it has been found out that the ability of tower to withstand the earthquake forces could be increased with the provision of non-linear rubber isolator and the provision of eccentric bracing system has greater effect than other two X & V bracings.

However, concluded that this kind of transmission tower would be safer even in severe earthquake (zone 5) which satisfies both serviceability and collapse criteria.

Earthquake factor has been considered in Tower loading for foundation design.

8 STAKEHOLDER & PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Carry out meaningful consultation with Project-affected people and other stakeholders and facilitate their informed participation in the consultations. Meaningful consultation is an interactive process to provide information and facilitate informed decision-making that:

(a) begins early in the preparation stage of the Project to provide accurate information on the proposed Project, minimize misinformation and unsupported expectations, and obtain initial views on the Project;

(b) Is carried out on an ongoing basis throughout the implementation and life cycle of the Project;

(c) Is designed so that all relevant parties have a voice in consultation, including national and subnational governments, the private sector, nongovernmental organizations and people affected by the Project, including, as applicable, Indigenous Peoples;

(d) Provides additional support as needed so that women, elderly, young, disabled, minorities and other vulnerable groups participate;

(e) provides timely disclosure of relevant and adequate information, including availability of the Project's GRMs and of the PPM or other Bank-approved IAM, which is understandable and readily accessible to the people affected by the Project and other relevant stakeholders;

(f) is undertaken in an atmosphere free of intimidation or coercion;

(g) is gender sensitive, inclusive, accessible, responsive and tailored to the needs of vulnerable groups; and

(h) enables the consideration of relevant views of people affected by the Project and other concerned stakeholders in decision-making. Continue consultation with Project-affected people throughout Project implementation as necessary on issues related to environment.

8.1 Public Consultation

Considering the nature of the project and its geographical and socio-economic context, the key stakeholders' groups relevant to the project have been identified and presented in the table below.

Table 8.1: Stakeholder Group Categorization

Category	Primary Stakeholder	Secondary Stakeholder
Community	● Project Affected Families/Land Owners of the transmission line ● Local Community like Women's self-help groups (SHGs) active in villages ● Vulnerable group including female headed households/ Indigenous Peoples/People below poverty line/Handicapped/Youth/Orphanns/ Landless laborers, etc,	● Opinion holders & ● Community Leaders
Government Bodies/ Institutional Stakeholders	● Local Gaon Panchayats ● Regulatory Authority like Circle Office/Agriculture/Horticulture /Forest department etc. ● District Administration i.e. Deputy Commissioner	● State Administration
Other Groups	Contractors and sub-contractors ● Labours/ Workers ● Civil Society Organisation	

	● Non-Government Organisations	

The community consultations were carried out in all the villages along the transmission line corridor with local habitants. A total of sixty-five (65) participants participated in the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS substation. The participants included socio-economically vulnerable communities, women and local community leaders residing near the proposed transmission line. The consultations were conducted on 13th October 2025, 15th October 2025, 27th October 2025, 11th November 2025, 12th November 2025, 13th November 2025, 15th November 2025, 21th November2025, 24th November 2025 and 25th November 2025. Community welcomed the construction of proposed Transmission Lines. No major environmental and social issues were raised during the consultation process. Most of the project affected families asked about the payment procedure of tower footing area, access road and RoW by the Project affected households. Further, the project affected households have shown interest in unskilled works on temporary basis when the civil works are initiated. Local people are waiting eagerly for the implementation to start, so they could receive their compensation amount and hoped for some employment generation. Attendance sheet of consultation with public and some photographs are provided in **Appendix -4A & 4B.**

The summary of community consultations is provided in **Table 8.2** below.

Table – 8.2: Summary of Community Consultation

Issues Discussed	**People's views and perceptions**
General Perception	Majority communities (including women) were aware of the construction of proposed 400 kV S/C LILO at Sonapur GIS from 400kV Silchar-Byrnihat Transmission line. Some have heard it but not sure about the details of the proposed Transmission lines work. All the people were positive and supportive towards the construction of proposed Transmission Lines.
Support of local people for the construction of Transmission lines to to Sonapur GIS	Most of the communities expressed their support during implementation of the construction of proposed Transmission lines to Sonapur GIS. They are happy for contribution of Government of India's effort towards construction of proposed Transmission lines to Sonapur GIS. Most of the communities expressed that there should be no adverse impact due to the construction of proposed Transmission lines.
Critical issue and concern by the local people for the proposed Transmission Lines to Sonapur GIS substation locations.	Most community members indicated that they did not anticipate any major concerns related to the construction of the proposed transmission lines to the Sonapur GIS.

Issues Discussed	People's views and perceptions
Project site selection criteria (Proposed Transmission lines)	The communities emphasized that the project should avoid or minimize impacts on vegetation and on locations of community importance, such as common property resources, structures, or community gathering places. Some participants also recommended that adequate safety measures be implemented to protect people during the construction of the proposed transmission lines to the Sonapur GIS.
Employment potential in the construction of proposed Transmission lines to Sonapur GIS.	The community indicated that the construction and subsequent operation of the proposed transmission lines to the Sonapur GIS may generate livelihood opportunities for local unemployed residents, particularly through the establishment of small-scale, self-supporting enterprises such as tea stalls, small eateries, or grocery shops. Community members also expressed the need for local engagement in project-related employment, requesting that opportunities extend beyond unskilled labour to include semi-skilled and supervisory roles. Concerns were raised that construction activities are typically contracted out, with contractors often deploying labour sourced from outside the area, thereby limiting employment prospects for local inhabitants. Additionally, some participants noted that the improved and more reliable electricity supply anticipated under the project is expected to facilitate the development of small and medium-scale businesses within the project area.
Socio economic standing: land use, cropping pattern	The primary sources of livelihood for the communities include agriculture, wage labour, and small-scale businesses. Most households engage in single-crop cultivation annually, with paddy and vegetables being the predominant crops.
Source of drinking water	The primary sources of drinking water for the community are hand pumps and tube wells, with ring wells also serving as an additional source. A few households reported concerns regarding the taste of the water, attributing it to high iron content, and therefore use simple sand filters to make the water suitable for consumption. Overall, water availability is considered adequate, as the groundwater table remains relatively high throughout most of the year, except during the winter months.
Negative impact on food grain, availability /land use	Overall, the communities did not anticipate any adverse impact on food or grain availability, as the construction of the proposed transmission lines to the Sonapur GIS will be confined within the designated 46-metre Right of Way (RoW) for the 400 kV line. Compensation for the use of land within tower footing areas and the RoW will be provided by AEGCL to the affected landowners.
Will project cause widespread imbalance by cutting fruit and commercial trees in the locality	Trees located within the Right of Way (RoW) of the proposed transmission lines to the Sonapur GIS will be either cut or trimmed as required. Compensation for such affected trees will be provided to the respective owners in accordance with the government-approved rates and as per ESMPF and Entitlement matrix.
Will project cause health and safety issues	Most community members did not anticipate any significant health or safety concerns associated with the construction of the proposed transmission lines to the Sonapur GIS. However, some participants emphasized the need for appropriate safety measures to be implemented to ensure the protection of local residents during the construction period.
Protected areas	No protected areas are located in the vicinity of the proposed transmission lines.

Issues Discussed	People's views and perceptions
Will project setting change migration pattern of animals	The communities consulted were aware of the presence of migratory birds and wildlife in their area and in the vicinity of the proposed transmission lines. They indicated that no significant impacts on animals, birds, or their habitats are expected as a result of the construction of the proposed transmission lines to the Sonapur GIS.
Migration pattern	A majority of the communities reported outward migration of young people, particularly males, to larger urban centres in search of employment. The most common destinations included Guwahati, Kamrup Metro, Nagaon, and Sonitpur for both general and factory-related jobs. Instances of migration to the capital cities of other northeastern states were noted to be relatively limited.
Perceived benefits from project	The majority of respondents expressed that the construction of the proposed transmission line to the Sonapur GIS would help alleviate the prevailing energy challenges in the area, including frequent load shedding and low voltage. Community members anticipated that the project would improve the reliability and consistency of household electricity supply. Some also believed that enhanced power availability would support rural electrification efforts and stimulate the establishment of small and medium-scale enterprises in the region.
Perceived loss	he impacts are expected to be temporary/Permanent in nature, primarily involving the loss of crops, trees, or minor structures, and will be compensated by AEGCL in accordance with applicable norms.

In addition to community consultations described above, meetings were also held with officials of the Circle Office, Lat Mandal Sonapur. Furthermore, Focus Group Discussions (FGDs) were conducted with with women's groups, including Self-Help Groups, in villages within the affected area on 11 and 13th October, 2025. Sample photographs of these consultations are provided below for reference, and the attendance sheet is included in **Appendix- 4C.**





The transcript of these discussions will help AEGCL and EPC contractor in proper needs assessment to ensure the issues raised by community are addressed appropriately. Consultations will be carried out on

an on-going basis throughout the sub-project cycle.

8.2 Continuous Consultation and Participation

AEGCL with PMC will carry out meaningful consultation as per requirement (Monthly consultation with local people nearby the Transmission lines passing through different villages by PMU, PIU and PMC along with EPC Contractor) with project affected families and other concerned stakeholders, including civil society and facilitate their informed participation. Consultation process undertaken under the directions of the PMU (i) will begin in the sub-project preparation stage and will be carried out on an on-going basis throughout the sub-project cycle (ii) will provide timely disclosure of relevant information that is understandable and readily accessible to groups and individuals, and specially women; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) will be gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) shall enable the incorporation of all relevant views of affected people and other stakeholders into decision making, such as subproject design, mitigation measures, the sharing of development benefits and opportunities and implementation issues. Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results will be documented and reflected in the environmental and social monitoring report. Feedback about project should be obtained time to time from PAFs during consultation. PAFs may approach GRC if any grievances arise.

8.3 Public Consultation Information Disclosure

AEGCL will submit to AIIB the following documents for disclosure on AIIB's website:
(i) the final ESIA;
(ii) a new or updated ESIA and corrective action plan prepared during sub-project implementation, if any; and
(iii) the environmental and social monitoring reports.

AEGCL will provide relevant environmental information, including information from the above documents in a timely manner, in an accessible place and in a form and local language(s) understandable to affected people and other stakeholders in accordance with the AIIB's ESP.

ESIA results will also be communicated to the local community before commencement of construction through posting on the website of AEGCL and other suitable means as well as providing a mechanism for the receipt of comments.
The information disclosure mechanisms adapted during consultation process are to identifying stakeholders who may be affected by the transmission line project. This includes:

- Local communities and residents along the transmission corridor.
- Landowners and people whose land or properties might be impacted.
- Indigenous groups or communities with specific land use and cultural practices in the area.
- Government agencies responsible for regulating environmental, land use, and energy sectors.
- Environmental and social organizations monitoring the impacts on natural resources and communities.
- General public in areas that might experience indirect impacts, such as noise or visual disruption.

The Public Consultation is organized at community level where the transmission lines are passing, typically at key point's area along the route. Public meetings allow the project team to present the project, answer questions, and gather feedback and Focus Group Discussions with smaller, targeted discussions with specific groups (e.g., women, indigenous groups, and farmers) are held to understand their unique concerns and needs.

ESIA - ESMP will be disclosed online on the website of AIIB and AEGCL. The executive summary of ESIA – ESMP shall be translated in local language (Assamese) and the same will be disclosed on the website of AIIB and AEGCL. Their hardcopies in English and executive summary in Assamese language shall be made available at the following locations.

1. PMU: Project Director,
   Address: 1st Floor, AEGCL, Bijulee Bhawan,
   Contact No.: 0361-2739520
   Website: www.aegcl.coc.in
2. PIU: Project Manager
   Address: AGM, 132 kV Kahilipara GSS, AEGCL
   Email: agm.kahilipara@aegcl.co.in

ESMPF is disclosed in AEGCL website: https://www.aegcl.co.in/aiib-project-details/

Stakeholder Consultations undertaken as Part of the ESIA Process

As part of the ESIA for the project, the following consultations were undertaken.

Table 8.3: Consultations undertaken for the Project

Sl. No.	Date	Stakeholder Details	Location	No. of Participation	Issues discussed
1.	13th October, 2025	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Barni	2 nos. (Male-1, Female-1)	• Discuss with the local community about details of the project and understanding the project, the construction of proposed Transmission lines work to Sonapur substation. • Payment procedure of land compensation, Trees and crop compensation process to the landowners. • Other impacts associated with transmission lines and approach to minimizing the impact.
			Moupur	4 nos. (Male-3, Female-1)	
2.	15th October, 2025	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Dhemai	5 nos. (Male-3, Female-2	
			Lofar	2 nos. (Female-2)	
3.	27th October	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Nartap	5 nos. (Male-5)	
			Lurigaon	5 nos. (Male-3, Female-2)	

4.	11th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Bhakuwagog	2 nos. (Male-1, Female-1)	• The documents required to be submitted from the landowners for disbursement of Compensation for tower footing, RoW and *zirat* compensation, etc. • Discuss regarding the common property resources such as cemetery, school, community hall, hospitals, Mandir, Masjid, habitation areas etc. shall be completely avoided while finalizing the route of lines/check survey. If any utilities is found during the check survey measures will be taken to avoid public utilities (diverting the lines). • Also informed the community that Grievance Redressal Committee is formed for the project, the local community may directly approach the Grievance Redressal Committee if any grievances arise at site.
			Sonapur Pathar	3 nos. (Female-3)	
5.	12th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Sonapur	6 nos. (Male-2, Female-4)	
			Barkuchi	3 nos. (Male-1, Female-2)	
6.	13th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Barni	6 nos. (Male-2, Female-4)	
			Bhakuagog	2 nos (Female-2)	
7.	15th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Sonapur Pathar	4 nos. (Male-4, Female-1)	
8.	21th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Lurigaon	5 nos. (Male-3, Female-2)	
9.	24th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Dhemai	5 nos. (Male-4, Female-1)	
10.	25th November	Discussion with local community at the LILO of the 400 kV S/C Silchar-Byrnihat LILO Line at Sonapur GIS Substation	Barni	6 nos. (Male-4, Female-2)	

As part of these consultations an attempt was made to develop an understanding of the stakeholder group's key concerns and expectations from the project, the stakeholder group's perception of the project and triangulate the secondary information available on the area.

9 GRIEVANCE REDRESS MECHANISM

General overview of the Grievance Redress Mechanism Assam Intra-State Transmission System Enhancement Project

9.1 Objectives

The Assam Intra-State Transmission System Enhancement Project (the Project) aims to strengthen Assam's electricity transmission system. As the Project is funded by the Asian Infrastructure Investment Bank (AIIB), it complies with the Environmental and Social Framework and the Policy on the Project affected People's Mechanism of the AIIB. The Environmental and Social Management and Planning Framework (ESMPF) of the Project provides for the establishment of a Grievance Redress Mechanism (GRM). The GRM is a free system that registers and attempts to resolve concerns or complaints by Project-affected people (PAPs) or construction workers. This process aims to quickly resolve disputes and avoid litigation, thus ensuring the smooth implementation of the project activities.

At all levels of the project Grievance Redress Mechanism, the Grievance Redress Committee (GRC) members should uphold the objectives of the GRM and strive to achieve them. The primary objectives of GRM are to provide an accessible, transparent, efficient and predictable mechanism for resolution of grievances to all projects by:

- Popularizing the GRM and how it can be accessed for free.
- Receiving grievances in various possible forms (Written, Verbal, Electronic, Email, Social Media, Telephone, Fax, Suggestion Box)
- Establishing clear procedures for redress that covers:
- Registration in the GRM logs all grievances (including minor and verbal).
- Acknowledgement to the complainant, explaining expected duration for resolution.
- Investigation of the grievance, proposing a solution to the complainant and if acceptable closure of the complaint. OR
- Escalation of the grievance to Tier II which should be communicated to the complaint.
- Investigation of the grievance, proposing a solution to the complainant
- Provision of feedback and closure of the grievance in the GRM Log.
- Complaint should be made aware that:
- There is no retribution or intimidation for complainants.
- Access of the GRM is free for the complainants.
- The GRM does not replace the judicial system
- Observe for any repeated complaints and inform PMU of such for their systemic resolution.
- Providing an environment that fosters free and honest exchange of information, views, and ideas.

9.2 Stakeholders with Grievances

It is likely the following categories of stakeholders may have grievances and file their grievances for redressal namely -

- Individuals, both men and women
- Communities/ Groups of individuals

- Project workers – local and migrant
- Community Based Organizations or Common Interest Groups
- Firms, Companies, Enterprises, Service Providers, and other businesses
- National/ International Non-Government Organization (NGOs)

9.3 Institutional Arrangement of the Multi-Tier GRC Mechanism

The Assam Intra-State Transmission System Enhancement Project provides for a **multi-tier Grievance Redress Mechanism (GRM)** to ensure effective resolution of grievances at the local level and their escalation to higher levels when required. The mechanism is designed to be transparent, accessible, fair, and responsive to the needs of Project-Affected Persons (PAPs), workers, and other stakeholders.

Tier 1: Circle/Field Level Grievance Redress Committee (CGRC) – PIU Level: First point of contact for complaints at the local level. The CGRC is responsible for receiving, registering, acknowledging, and addressing grievances within **10 working days**. If unresolved, grievances are escalated to Tier 2.

Tier 2: Project Implementation Unit (PIU) Level GRC: To review and resolve grievances escalated from the Circle/Field Level CGRC within **20 working days**. If grievances cannot be resolved at this stage, they are escalated to Tier 3.

Tier 3: Project Management Unit (PMU) Level GRC: To resolve grievances of significant complexity or those with broad implications for the project. The PMU GRC also provides oversight, ensures consistency of grievance handling across PIUs, and monitors systemic issues. Grievances unresolved at this level may be pursued through the **judicial system** or, if related to AIIB compliance, may be taken up under the **AIIB Project-affected People's Mechanism (PPM)**.

Table 9.1: Roles and Responsibilities of GRC Member

PMU/ PIU GRC Members	Community GRC Member
● Receives grievance from complainant and record them in a logbook. ● Acknowledge receipt of complaints with a written record. ● Arrange for GRC meetings to consider the grievances. ● Work closely with the GRC members to develop and implementing actions to resolve grievances. ● Prepare minutes of GRC meetings and record solutions. ● Provide feedback information on the status of resolution to the complainant within assigned timeline.	● Popularize the existence, functions, and accessibility of the GRM among all project affected people, both men and women. ● Encourage key community members to facilitate submission of complaints, if needed. ● Attend regularly and actively participate in GRM meetings to review and provide solutions to project related grievances. ● Facilitate and immediate resolution of grievance. ● Accept and record grievances from community members. ● Facilitate the communication of the response of the GRC to complainants/ aggrieved.

● Review grievance response and submit to Contractor/PIU/PMU for approval or implementation. ● Submit proposed solutions to the complainant within assigned timeline. ● Ensure proper logging, escalation, tracking, reporting, and following up on all project specific grievances. ● Swiftly escalate any grievances that cannot be resolved at the project level or may pose a big reputational risk to the project. This includes any complaints related to the health, safety, dignity, and wellbeing of any person (both men and women). ● Notify PMU within 12 hours of any grievances that require investigation or intervention by the police or other relevant authorities. ● Provide monthly update to a member of the PMU who will track grievances and always include a section on grievance management in the monthly progress report.	● Keep communicating project related matters to GRC/ PIU.

Table 9.2: Most Common Grievances and Redressal

Common Grievance Categories	Issues and Likely Solutions
Technical/ Engineering	● Design related – Suit the design to the site. Restrict the width according to the available land and modify the design accordingly; ● Alignment related – Always use GPS coordinates. In case of problem contact Revenue department to correct the alignment; ● Quality related – Get the materials and finished product tested at reputed laboratories and publicize the results.
Environmental	● Storm water – Do not obstruct or divert natural drainage. Provide for culverts or bridges where necessary Stone blasting – Take precautions as per law and inform the communities accordingly ● Dust – Keep watering as required so that dust doesn't spread or rise. ● Noise – Use barriers at sensitive receptors and take up work at appropriate timings. ● Uncovered borrow areas – Dig barrow pits as per specifications. ● Waste Disposal – Dispose of waste at designated places only.
Social	● Disruption of other existing public services e.g. hospitals, schools, Water and electricity supply – Consult communities and minimize the disruption of service. Provide alternative supplies. ● Historical and Cultural sites – Follow the government guidelines on this. Do not deface any historical or cultural sites.

Common Grievance Categories	Issues and Likely Solutions
	● HIV/AIDS issues – Follow the government SoP for these. Conduct awareness campaigns among the communities and workers. ● Child labour – Avoid child labour. No children below 14 years on work. No children below 18 years on hazardous work. Child labour – Avoid child labour. No children below 18 years on work. No children below 18 years on hazardous work. Further, the children between the ages of 16 and 18 may be engaged in the project only after conducting a risk assessment and ensuring that their health, safety, and morals are safeguarded. ● Sexual Exploitation and Abuse / sexual harassment and Gender-Based Violence – Conduct awareness camps among workers and community. Have a code of conduct. Set up Internal Complaints Committees to redress gender related grievances.
Land, Compensation and Resettlement	● Non-payment of compensation money – Do not take possession of land before paying full compensation. ● Underpayment of compensation money – All compensation valuation has to be done as per the LA Act 2013 and verified before payments. ● Disputes of land ownership – Refer to Revenue Department for measurement and survey to decide on the ownership. ● Injurious affections such as cracks in buildings, damages to properties – Do take care not to cause damage to houses. Repair all damages and bring them back to original status. ● Boundary queries between PAPs – Do not get involved in this. Leave these matters to PAPs to decide themselves.
Road Safety	● Accidents – Report immediately to PIU/ PMU. ● Humps – Do not erect humps without the permission of PIU. The hump has to be as per the design. No private person can built humps. ● Signage – All signage has to be fixed by PIU/ Contractor. ● Cutting of pavement by utility companies – No utility company can cut the pavement without the permission ● Overloaded vehicles/ Road littering – Such incidents to be reported to PIU for action.
Occupational Health and Safety	● Protective gear – The workers must wear protective gear at all times during the work. ● HIV/AIDS services – The workers and communities must be educated about these. They should follow the SoP.
Governance	● Procurement – To be transparent and all matters related to procurement to be disclosed. ● Contractor highhandedness – All contractors to be instructed not to deal with the communities directly. Always involve PIU in dialogue with communities. ● Corruption – Such cases to be sent to the respective agencies for enquiring and investigation.

Table 9.3: DOs and DON'Ts for GRC Members

DOs	DON'Ts
● Respect complaints. ● Follow the established GRM procedures. ● Popularize the GRM's existence, accessibility, and free access. ● Establish accessible compliant receipt locations and channels for vulnerable groups considering their constraints. ● Maintain logbooks. ● Establish clear timetables for resolving grievances. ● Assign each compliant a unique ID, track and report its resolution. ● Work with the complainant to find a resolution throughout the GRM. ● Keep complainant informed of resolution process. ● Seek feedback from the complainant to improve GRM functionality.	● Intimidate, threat, or harass complaints. ● Set unrealistic redress durations. ● Exclude vulnerable groups. ● Create constraints in filing grievances. ● Create barriers or compound the procedures for grievance filing receipt. ● Disclose aggrieved identity to others. ● Make false promises to the complainant. ● Be biased in redressal. ● Expect or seek any compensation or benefits from complainants.

General overview of the Grievance Redress Mechanism
Assam Intra-State Transmission System Enhancement Project

Project Introduction: The Assam Intra-State Transmission System Enhancement Project (the Project) aims to strengthen Assam's electricity transmission system. The Project will facilitate connection of remote areas, enhance the capacity and reliability of the system, improve voltage profile, and reduce losses and ultimately enhance satisfaction for all categories of consumers. As the Project is funded by the Asian Infrastructure Investment Bank (AIIB), it complies with the Environmental and Social Framework and the Policy on the Project-affected People's Mechanism of the AIIB.

The construction activities under the Project may cause some minor disturbances to the physical environment and communities. These are typical of civil works, such as generating dust, noise, air pollution, and construction debris, influx of construction workers and limited need to acquire permanently or temporary land. Thus, a multi-tiered Grievance Redressal Committee (GRC) will be applicable to the project in its entirety. To honor the GRM, Assam Electrical Grid Corporation Limited (AEGCL) will adopt the practice to resolve any major/ minor grievances, where AEGCL shall accept, review and address issues or problems raised by Project Affected Persons (PAPs), local people and project workers related to project works. GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost, other additional assistance for vulnerable groups including Indigenous Peoples (IPs) and grievances related to environmental issues (if any).

The Environmental and Social Management and Planning Framework (ESMPF) provide guidelines how to reduce potential risks and mitigate impacts. Site-specific Environmental and Social Management Plans (ESMP) gives specific measures for specific locations.

Overview of the Grievance Redress Mechanism

The Project provides for the establishment of a Grievance Redress Mechanism (GRM). **The GRM is a free system that registers and attempts to resolve concerns or complaints by Project-affected people (PAPs) or workers/employees arising from project activities.** This process aims to quick resolve of disputes and avoid litigation, thus ensuring the smooth implementation of the project activities. Every person, man, woman, or construction worker employed in Project activities, who feels that they have been adversely affected by the Project, can file their concerns for free to the GRM. **The Project guarantees that there will be no reprisals or retributions for raising grievances**. The GRM process does not prevent project affected people to seek their rights through the judicial system but provides an additional and free way to resolve problems. Anonymous grievances are acceptable, but it will be impossible to inform the complainant of the outcome. In this case, the grievance and the proposed resolution will be publicized on site.

The Project's Grievance Redress Mechanism (GRM) is designed to be **inclusive, accessible, and culturally sensitive**, particularly for Indigenous Peoples (IPs), vulnerable groups, and women. Key provisions include:

1. **Inclusive Access**
    - Dedicated representatives from IP and vulnerable communities on GRCs at PIU and PMU levels.
    - Assistance for illiterate or marginalized persons to submit grievances orally, in writing, or electronically.
    - Translation and language support for local dialects of Indigenous Peoples.

2. **Gender-Sensitive Measures**
    - Female GRC members at all levels to facilitate women's participation.
    - Private and safe channels for women to raise sensitive grievances, including SGBV-related issues.
    - Awareness campaigns targeting women and vulnerable groups to inform them about free access to the GRM.
3. **Grievance Monitoring and Reporting**
    - Maintain a grievance register capturing: complainant details, type of grievance, date received, time taken for resolution, outcomes, and feedback.
    - PIU submits **monthly summaries** to PMU; PMU consolidates **quarterly reports**, highlighting:
        - Number of grievances received and resolved
        - Average resolution time
        - Outcome of each grievance
        - Gender and IP/vulnerable group disaggregation
    - Monitoring ensures timely resolution, transparency, and systemic improvements.

Complaint which may be arises during the project implementation period (Pre-Construction, During Construction and Post Construction) will be handled according to the following procedure:

1. Project-affected person approaches a member of the CGRC (Tier-1) in person or via the phone/WhatsApp. (Dedicated phone number is available in the Tier-1 committee -Table -9.4 below).
2. The Circle level GRC (Tier 1) member receives the grievances and records the details in the GRM logbook.
3. The CGRC (Tier-1) acknowledges the receipt of the grievance and provides a dated proof (official slip, text or WhatsApp message).
4. The CGRC (Tier-1) gathers information, visits site and interviews people to evaluate if they can find a resolution of the grievance within 10 working days.
5. The CGRC (Tier-1) informs grieved party of the proposed resolution in writing. a. Grieved party can accept the proposed solution, which is duly recorded. b. Grieved party may not accept the proposed solution, which is duly recorded.
6. If the CGRC (Tier-1) is unable to find a solution, or if the grieved party does not accept the proposition, the CGRC can automatically escalate the issue to the Tier -2 GRC, if grieved party agrees.
7. The Tier-2 GRC acknowledges the receipt of the grievance and provides a dated proof (official slip, text or WhatsApp message).
8. The Tier 2 GRC gathers information, visits site and interviews people to evaluate if they can find a resolution of the grievance within 20 working days.
9. The Tier 2 GRC informs grieved party of the proposed resolution in writing. a. Grieved party can accept the proposed solution, which is duly recorded. b. Grieved party may not accept the proposed solution, which is duly recorded.
10. The grieved party may seek their rights in the court of law.

AIIB PPM mechanism: The Project-affected People's Mechanism (PPM) was established by AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement

its Environmental and Social Policy (ESP) when their concerns cannot be addressed satisfactorily through Project-level grievance redress mechanisms or AIIB Management's processes. The PPM entered into effect on March 31, 2019. The PPM is guided by the Policy on the PPM (PPM Policy) and Rules of Procedure of the PPM (PPM Rules of Procedure).

Project-affected people may raise their concerns regarding the environmental and social aspects of an AIIB-financed Project with the Client and AIIB during the preparation and implementation of the Project. The Complaints-resolution, Evaluation and Integrity Unit (CEIU) is responsible for the functioning of the PPM. information link.

https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html

Table 9.4: The members of the Tier-1 GRC and their communication details in the project Districts

Sl No	Officials	Designation In the Committee	Communication Address/Mail ID/Contact details
1	Deputy General Manager (Project Authority)	Deputy Chairman	Guwahati Lower Assam T&T Circle, AEGCL dgmttc.guwahati@aegcl.co.in Ph No- 94351-99056
2	Sub-Divisional Magistrate, Kamrup Metropolitan District	Member	Lichubagan, Hengrabari, Guwahati, Assam 781036 Ph No- 0361-2540149
3	Assistant General Manager, (Project Manager)	Member	132kV Kahilipara GSS, AEGCL agm.kahilipara@aegcl.co.in Ph No- 0361-2381366.
5	Assistant General Manager (Project Manager)	Member	Guwahati Transmission Division, AEGCL agm.narengi@aegcl.co.in Ph No- 86389-64147
6	Representative of Local Panchayat Council	Member	Sri. Kameswar Konwar, Samatapathar Panchayat
		Member	Sri Ajit Nath, Ward Member, Bangara Gaon Panchayat
		Member	Smt Bina Ranghang. Ward Member, Azara Gaon Panchayat
7	Women representative of village/council	Member	Smti Malati Das, Sonapur, Kamrup, Assam
8	President, Kachutuli Gramounnayan Committee	Member	Sri Moinul Haque Choudhury, Sonapur Kamrup, Assam
9	Member of Development of Environment & People Awareness Society of Assam	Member	Sri Prasanna Hazarika, Sonapur, Guwahati, Assam

Table 9.5: The members of the Tier-2 GRC and their communication details in the corporate level

Sl. No.	Designation	Position in the Committee	Communication Address		Website & Email id
1.	Chief General Manager (PP&D), AEGCL cum Project Director (EAP) Projects, AEGCL.	Chairman	Assam Electricity Grid Corporation Ltd, (AEGCL) First Floor, Bijuli Bhawan Guwahati - 781001	Contact No.: 0361-2739520	Website: www.aegcl.co.in Mail Id: eap.cell@aegcl.co.in
2.					
3.	Dy. General Manager (EAP), PMU, AEGCL	Deputy Chairman		Contact No.: 0361-2739520	
4.	E & S Safeguard Specialist, PMU, AEGCL	Member		es.aegcl.pmu@gmail.com	
5.	Project Related AGMs (EAP), AEGCL	Member		eap.cell@aegcl.co.in	
6.	Joint Secretary (Power, Electricity), GoA	Member	GoA, Power (Electricity Dept.), Assam Secretariat, Dispur, Guwahati-781006 Contact No.: 0361-2237260		dy.secy.powe@gmail.com
7.	Team Leader, Environment Expert and Social Expert, PMC	Member	House No 1, Saniram Bora Road, Near Bora service Petrol Pump, Guwahati, Assam 781007		aegcl.pmc@feedbackinfra,com

In the event of any adverse incident, including safety hazards, sexual harassment, or other life-threatening situations, the aggrieved person may approach the concerned officials designated under the Tier-1 or Tier-2 committee for immediate assistance and appropriate action. Such incidents shall also be promptly reported to AIIB, as required.

Grievance Register

Grievance Register	
Date of Grievance Recorded	*** The mobilization of EPC is awaiting and once EPC starts their work in the S/S as well as in T/L, then the grievances may arise if any, the record will be maintained accordingly**
Grievance Recorder	
Grievance submitted through	
Name of Complainant	
Complainant Preferred Contact	
Complainant Address	
Type of Grievance	
Describe Grievance	
Date of Grievance Occurrence	
Date of Acknowledgement	
Mode of Acknowledgement	
Brief Outline of Proposed Resolution	
Action Taken	
Action Taken on	
Outcome	
Outcome communicated to PAH on	
Status Update	
Mode of Complainant Update	
Acknowledged by	
Date Closed	
Days to Close Grievance	
Date of Grievance Received to Tier 2	
Date of GRC meeting (2nd Tier)	
Estimated Time for Resolution Action	
Taken Action	
Taken on	
Outcome	
Outcome communicated to PAH on	
Status Update	
Mode of Complainant Update	
Acknowledged by	
Date Closed	
Days to Close Grievance	

10 Environmental and Social Management Plan

10.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) WITH SPECIFIC POTENTIAL E&S IMPACTS

This chapter outlined the ESMP for identified impacts and the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored. The detailed Management Plan is outlined as under.

10.2 Physical Environment

Table 10.1: Detailed Management Plan (Physical Environment)

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Planning and Construction Phase					
Land use and Land Cover	● No major anthropogenic activities are observed in the area except agricultural activities and crop. ● The project will result in change of the land use within the land parcels where the transmission towers are located. Besides this the land falling under the RoW of transmission line will also have limited change in land use in terms of restriction of activities to be undertaken on this area.	The land requirement for the tower base has been considered as per the IS Codes.	Footprint tower foundation and RoW of transmission line	PMC / AEGCL	-
Soil Environment	● Digging of foundation pits for the towers may affect the soil quality. ● Foundations shall be dug up to a depth of 3-3.5 m depending upon the tower type and soil characteristics. At the tower sites, all vegetation within the footprint of the tower base and additional surrounding area shall be cleared for ground vegetation. Foundation pits shall be backfilled by the excavated soils;	● Vegetation clearance and excavation to be done in the marked excavation and construction area only; ● The excavated soil to be stored on site for back filling; ● Any top soil that is to be removed for construction of tower footings / foundations to be temporarily stored /stack at least at a lead of 2 meters away from the edge of the pit and then	Footprint tower foundation and RoW of transmission line	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	● Compaction of soil during excavation, transportation of construction material & tower components, foundation work, backfilling, tower erection and stringing lead to temporary effects on natural infiltration of rainwater, but these impacts are temporary, localized and marginal; ● Soil contamination at tower locations shall be from result of leaks and spills of oil, lubricants, or fuel from construction equipment. ● General construction waste generated onsite comprised of waste concrete, wooden pallets, steel cuttings / filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminum cans and waste paper shall be generated by the construction workforce and labour camp site. A small proportion of the waste generated during construction phase shall be hazardous and include used oil, grease and waste oil containing rags. ● During foundation activities at tower locations, excess excavated material shall be generated.	be used as a (soil) top cover after construction activities are complete; ● After completion of construction activities, site will be cleared for any excess excavated material and leftover construction material. Disposal areas for same will be identified in consultation with the concerned department; ● Spill management kit will be provided and immediately clean-up of any spillages; ● Provision of waste collection bin and disposal of domestic waste will be provided at labour camp site; ● Tower components and materials shall be stored at an elevated level using wooden sleeper to raise the tower parts above the ground level near the construction site. It is to be noted that the tower parts are taken to erection site on daily basis for erection from the EPC store, thereby reducing disturbance to surrounding standing crop and vegetation; ● The existing roads to be used for approaching tower locations.			
Ambient Air Quality	Ambient air quality will be largely impacted from the following sources during the construction phase:	● All vehicles shall be maintained as bi-annually and as per the Government procedure. It is mandatory that all	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	● Fugitive dust emissions from transportation of material, excavation, drilling, back filling, emission due to movements of vehicles, plying of heavy construction machinery etc.; ● Emissions from diesel generator for construction activities. ● The nearest receptor for dust emissions located within 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.	vehicle to be check for pollution control in every six months. Excavation activities to be avoided during windy weather conditions; ● The unpaved access roads shall be sprinkled with water as necessary to reduce dust, especially during April to September.			
Ambient Noise Level	● The foundation activities at transmission tower locations have effect on the noise level due to operation of concrete mixer, DG set, vehicular movement for transportation of materials. ● During erection of tower and stringing there can be some disturbance from noise due to vehicular movement for transportation of tower components, strings, and communications during erection and stringing. Also, during stringing there will be continuous operation of tractors carrying the strings from one tower to other. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.	● Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm) on 6 days a week. One paid holiday is given to workers. ● Avoid unnecessary honking of horns.	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Water Resources and Quality	● The transmission line generally requires about 50 m^3 of water for casting of foundations for each tower, which shall be sourced from local sources through tankers. The transmission line passes through River and nallah. ● Impact on local water resources.	● Location of storage area to be avoided on agricultural land and in close proximity to water bodies wherever possible. ● Excess excavated material not to be dumped in Nallah / water course / drainages, ● Clean water storage facility with PVC tank provided near the camp site for clean bathing / washing water to be made at labour camps; ● Wash room, sanitary toilet with septic tank and soak pit provide to the labours/camps to maintain hygiene of the areas. ● Approved water supply resource to be used for water requirements for concreting and curing during foundation activities; ● Wastewater generated at labour camp will have proper disposal arrangements such as septic tank and soak-pits.	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly
Drainage	● The study area has natural drainage pattern. ● The transmission line passes through River and nallah. ● Impact on local water resources.	Drainage system should not be blocked by the construction activity.	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly
Occupational Health and Safety	● The erection of transmission towers, stringing of line will require working at heights. The commissioning of the transmission line will also involve live power lines.	● Trained workers will be involved in the specific work activities such as tower erection and stringing; ● Prior to start of work, workers will be informed about the related safety risks	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	● The working at height has the risks of falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. ● Besides this, there could be slip and trip hazards especially during monsoon season. ● The area experiences heavy rainfall. Working during very heavy rain could cause health hazards; ● During tower erection and stringing activities, about 40 workers will be engaged for the LILO Transmission lines.	and precautions to be taken; ● Stop work in monsoon season. The monsoon seasons star from April to September. ● During summer and rainy days season with high temperature, work shall be started early in morning with no work during peak temperature in afternoon and rainy days. Generally, during hot days works start from 7 am to 11 am and in the afternoon 2.30 to 6.30 pm, with a rest break provided from 11:00 am to 2:30 pm to avoid heat stress ● Construction areas to be marked and cordoned off; ● Manual lifting by adult men to be less than 55kg and for women it should be less than 30kg; ● Eye protection for welding, cutting or similar operations which may cause hazard to eyes. ● All persons performing construction work to wear safety shoes and helmets confirming to national standard; ● Every worker engaged in handling sharp objects which may cause injury to hand shall be provided with suitable hand gloves; ● A construction worker handling cement and concrete to wear close fitting clothing, gloves, helmet / hard hat, proper foot wear, masks etc. and will take all precaution to keep the cement and concrete away from his skin; ● Moving parts of the hoists, grouting			

		equipment used for concrete work are securely fenced to avoid any injury or unsafe condition; ● The mixing of the concrete is done in such a way that minimum of dust escapes into the air; ● Erection of steel structures and working at heights should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc.; ● EPC contractor to ensure a First-aid Box is available at construction site; ● EPC contractor to ensure that health and safety procedures under the CESMP are in place and training on same are provided to the workers prior to construction; ● Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; ● Emergency contact numbers and route to nearest hospital shall be displayed at construction site. ● For hazardous activities such as erection and stringing, the local or host community shall be kept at a safe distance from the construction site. This shall be ensured through the installation of 'No Entry' signage at the site approach, proper barricading of the construction area, and deployment of security personnel to prevent unauthorized entry of the public. Additional safety measures may be implemented as per site-specific			

		requirements. ● During transmission line activities, appropriate health and safety measures—such as periodic health check-ups of workers, provision of proper personal protective equipment (PPE), issuance of height passes, (a "height pass" generally refers to a medical and safety certification that confirms a worker is fit to work at heights)., daily toolbox briefings, and safety inductions—will be strictly implemented. The Contractor's Safety Officer will be primarily responsible for ensuring these HSE measures at site, with additional supervision and monitoring by the PMC Site Engineer and AEGCL officials. ● For working at height: ● The contractor shall prepare and implement concise working instructions defining *working at heights* and associated risks. ● Mandatory use of appropriate PPE (safety harness, helmet with chin strap, safety shoes, etc.) shall be ensured at all times while working at heights. ● Clear guidance shall be provided on how and when to use each type of PPE. ● All PPE, including fall arrestors, shall be inspected before use. Inspection shall be carried out by a competent and designated safety officer/supervisor. ● Regular monitoring and inspection of fall arrestor equipment shall be undertaken, and records of inspections maintained.			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		● Unsafe, damaged, or expired PPE and fall protection equipment shall be immediately removed from use and replaced. ● The contractor shall conduct periodic refresher trainings for all workers engaged in working at heights to reinforce safe practices and correct use of PPE/fall arrest systems.			
Sensitive Receptors	There are 9 places of worship, 9 Schools, 2 Public health centers, 1 community hall, 1 Forest office, 1 Cemetery, 1 Panchayat office and 1 Library coming within a radius of 500 m from the proposed 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line. During construction phase insignificant impact may occur to the above sensitive receptors.	Periodical EQMT for Noise Level at 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line will be carried out nearby that sensitive receptors during construction phase and all possible measures will be taken to minimize pollution level.	Sensitive Receptors	EPC Contractor / PMC / AEGCL	Monthly
Operation Phase					
Soil Environment	Any spillage of Aluminium oxide paint during operation and maintenance of the transmission line towers may impact soil quality.	Preventive maintenance plan will be prepared for transmission line.	Project foot print	AEGCL	Monthly
Noise Level	The likely noise impacts from operation of the transmission line will be due to: ● Maintenance and repair activities; ● 'Corona discharge' from the overhead lines; ● Once operational, noise from energised overhead lines along the transmission line route can be produced by a phenomenon known as 'Corona Discharge' (a limited electrical breakdown of the air). Conductors are designed and constructed to minimise	The project design specifications include the measures to reduce the noise generated along transmission line.	Project foot print	AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	corona effects, although, under certain conditions this can be audible as a 'hissing' sound, sometimes accompanied by a low frequency hum. Conductors designed and constructed to minimise corona effects will be chosen for transmission. It is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area and furthermore, such noises are mostly restricted to rainy weather conditions. ● The nearest receptor for noise emissions located within 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.				
Visual Impacts	The project footprint comprises approximately 3.66 hectares of land that will undergo a permanent change in land use. Additionally, transmission line of 19.500 km in length will be constructed, supported by a total of 68 towers. The transmission line route passes through reserve forest / agriculture / crops, trees / vegetation and built up area. The vertical forms of the transmission towers would be prominently visible from the road and nearby settlements. Besides this, the farmers in the field would have clear view of these towers. It is to be noted that the study area already had other existing transmission towers and the new transmission	The route alignment had avoided settlement areas during project planning.	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	line will be easily absorbed in the existing landscape. The visual impacts will be perceived by two types of receptors, namely: ● Receptors located at a fix point, i.e. habitations within the project foot print and area of influence; and ● Receptors who will temporarily come into contact with the transmission line such as passing motorists in the area.				
Electro Magnetic Fields (EMPs)	The power evacuation through the transmission line during operation phase will result in development of electromagnetic fields. There have been some concerns about possible health risk from exposure to electromagnetic radiation from overhead transmission line. People working in the vicinity of transmission line are potentially prone to exposure to EMF. However, while the evidence of adverse health risks is low, it is still sufficient to warrant limited concern.	The minimum distance clearance had been provided in the project as per Electricity Act, 2003. The electrical clearance to protect from electromagnetic affect minimum 8.84 m is maintained for EHV lines.	Project foot print	PMC / AEGCL	Monthly
Occupational Health and Safety	The project will have two transmission of 400 kV power through the transmission line during operation phase. AEGCL will be responsible for O&M of the Transmission line. ● There is a possibility of line or towers / tower members falling to the ground, and safety risks during maintenance activities at towers, during the operational phase, contact with the transmission line can result in electrocution.	● Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; ● Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. The operational start date for electricity	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	● Ignorant people trying to tap electricity from high tension wire can lead to fatal accidents.	transmission and safety implications will be publicised locally in advance. ● The SOP for preventive maintenance and repairing of fault will be defined and followed.			

10.3 Biological Environment

Table 10.2: Detailed Management Plan (Biological Environment)

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Planning and Construction Phase					
Impacts due to Vegetation Clearance	The RoW of transmission line required 546 numbers of trees in the forest area where permission has been obtained and 11504 numbers of trees including fruit & non fruit bearing, bamboos etc. other than forest area to be cut/trimming. Vegetation clearance is the first step in the establishment of access / internal roads and excavation for the erection of tower footing and transmission tower foundations and ancillary facilities. Impact of vegetation clearance could happen at the time of line stringing at few places. Within the transmission line corridor floral and faunal species are commonly found. Ground clearance will be maintained from the lowest cable and any object that is grounded (tree etc.). Clearing of vegetation from reserve forest / agriculture / crops, trees / vegetation, built up and range land reduces options for nesting habitat for birds, shelter from predators, foraging resources,	In tower foundation location and transmission line corridor no mature fruiting tree or any other tree that is important for community will be felled. The tower locations will be adjusted to avoid mature trees that are important for the community. In case it is absolutely necessary, chopping and trimming of the branches will be undertaken. For forest area trees cutting, the required amounts towards Net Present Value (NPV), Cost of Compensatory Afforestation, and Overhead Charges, have been deposited through the online portal into the CAMPA account, amounting to ₹5,34,75,093.00.	Construction site and its associated facility location	Forest Department, GoA/EPC contractors /PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	shade, perching habitat and breeding sites. The loss of vegetation can also have a negative effect on soil quality and hamper survival of neighbouring floral species, burrowing faunal species and foraging resources for herbivores in the area.				
Impacts due to Construction Activities	Construction activities include excavation, movement of machineries, increased anthropogenic movement (men and transport) in the project study area. These activities are assessed with respect to disturbance of habitats and species. Excavation for the construction of the foundations for transmission towers and ancillary facilities has direct impact on burrowing fauna, mammalian fauna and an indirect impact on flora / fauna through the changing of soil properties. This type of impact could happen for each tower footing area. Anthropogenic movement will result in increased stress placed on fauna in the area that remain alert for an extended period of time and may prevent proper breeding, nesting, mating, socializing and foraging. Noise from anthropogenic movement (men and transport) from the construction activities shall cause disturbance to fauna in the nearby areas. This type of impact could happen during footprint and tower foundation, stringing activities of the transmission line.	• **In-house training provided to the labour force and supervisory staff for situations dealing with wildlife encounters.** • **No labour camp shall be established on the forest land shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas.** • **No damage to the flora and fauna of the adjoining area shall be caused.** • **No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work.**	Construction site and its associated facility location	EPC contractors /PMC / AEGCL	Monthly
Operation Phase					

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Collision and Electrical hazards for avifaunal species	Birds species identified during the ecological study were found roosting on wires and poles in the area. Some birds also utilize the transmission towers for nesting by placing the nests across wires or using holes in the tower itself. Collision of birds can happen with transmission line due to specific behaviours like courtship displays, aerial hunting as they may distract the birds from the presence of the power lines. Collision may happen for birds that make regular and repeated flights between roosting and feeding areas in proximity to power lines. Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C. Collision and electrocution hazard may happen at the transmission line.	The following mitigation measures will reduce the impact significance on avifaunal species: ● Installing perch rejecter on the cross arms. ● In order to mitigate and minimize collision of birds, power line markers should be used specifically areas that are more vulnerable to avifauna, which reduce the risk by increasing the visibility of overhead lines to birds (Sporer et al. 2013). ● A specific monitoring requirement in the form of wildlife monitoring checklist for LILO operator to regularly monitor/observe and record bird collisions and deaths along the transmission line ROW. The bird/wildlife monitoring is to be regularly reported to the PMU and the AIIB. **Checklist provided in Appendix – 7.**	Project foot print	PMC / AEGCL	Monthly

10.4 Social Environment

This section outlines the potential impacts, mitigation measures, monitoring and management responsibilities during construction and operation phases of the Transmission lines. In order to minimize adverse impacts during different phases of project lifecycle, mitigation measures, monitoring plan and responsibilities for its implementation.

Mitigation measures are provided for the construction activities and operation and maintenance activities.

The ESMP for the proposed transmission line construction works labour camps, tower foundation, erection and stringing activities and related health and safety measures will prepare as a priority.

In addition to the ESMP, an Abbreviated/Resettlement Action Plan report will be prepared before commencement of works. The purpose of the A/RAP is to ensure the restoration of livelihoods of the impacted PAFs. Grievance Redressal Mechanism has been formulated for the project. This GRM shall be applicable through the project lifecycle.

Table 10.3: Detailed Management Plan (Social Environment)

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
Construction phase					
Social	Health and safety risks	● EPC contractor should follow General Health and Safety measures as per contract agreement. Some of the key provisions relevant for the EPC contractor are mentioned below: ● Adopt an H&S Policy for construction workers; ● Eye protection for welding, cutting or similar operations which may cause hazard to eyes; ● All persons performing construction work to wear safety shoes and helmets confirming to national standard; ● Every worker engaged in handling sharp objects which may cause injury to hand shall be provided suitable hand gloves; ● Erection of steel structure is considered as a hazardous work. Workers engaged in erection of transmission tower to follow safety measures. The work should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc. ● The First-aid Box will be available at construction site which shall be ensured by EPC contractor ● EPC contractor shall ensure that health and safety procedures are in place and training on same will be provided to the workers prior to construction; ● EPC contractor shall ensure that adequate PPEs and safety measures are used during stringing activity. Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; ● Emergency contact numbers and route to nearest hospital shall be displayed at construction site.	All Tower locations and RoW of Transmission line	EPC Contractor	Monthly Report to AEGCL

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
		● The local / host community shall be kept at safe distance from construction site.			
	Impact on land and livelihood due to transmission line	● Entitlement in keeping with the Abbreviated Resettlement Action Plan for the transmission line. ● Payment of compensation for tower base area and RoW of transmission line in keeping with the Ministry of Power 2015 notification and Assam Government notification, 2017 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024. ● Ensure access of the local community to a Grievance Redressal Mechanism	Transmission Lines	PMU/AEGCL is responsible for payment of compensation	Monthly Report on payment of compensation.
Operation Phase					
Occupational Health and Safety	Health and Safety Risks; Electrical hazards	● The Lock Out-Tag Out system will be followed during maintenance/ repair activities at transmission line; ● Records of incident/ accidents shall be maintained; ● Root cause analysis shall be carried out for any incident/ accident.	All Tower Locations of transmission lines	AEGCL	Annual Report to AEGCL
Social	Loss of any crop or agricultural field during stringing or maintenance- Economic impact due to loss of crop/ agricultural field	● Have provision to compensate adequately any kind of damage to the assets/crops/other properties of the local incurred due to project maintenance. ● Ensure access of the local community to the GRM formulated for the project.	All Tower Locations of transmission lines	AEGCL	Regular reporting at time of maintenance Activities.
	Economic Displacement- Loss of income	● Provide priority to the local community for any contractual opportunities during the operations phase; ● Undertake skill training activities as part of the Abbreviated RAP	All Tower locations of transmission	AEGCL	Monthly progress reports

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
	sources	for the project which would allow the community to undertake income generation activities outside the project as well.	lines		
	Risk to Community health and Safety	● Undertake health awareness programmes among the local community, ● Implement GBV code of conduct for workers. ● Ensure access to the local community to the GRM for the project and that GRM can receive gender-based violence related grievances.	All Tower locations transmission lines	AEGCL	Annual reports

10.5 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMOP)

This chapter outlined the Environmental and Social Monitoring program for the project.

Table 10.4: Environmental and Social Monitoring Plan

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
Regulatory Compliance	Pre-construction, Construction and operation Stage	Availability of required regulatory permissions, Compliance to applicable environmental and labour laws.	-	Monthly	-	EPC Contractor	AEGCL / PMC
Labour Camp Monitoring	Construction Stage	Location of labour accommodation in relation to local village settlement, Availability of adequate potable water in labour camp and at construction site, Appropriate toilet and bathing facilities and their maintenance, Appropriate waste water disposal system, Source of cooking fuel, Appropriate lighting and ventilation in labour camp, Emergency response plan with emergency contact details displayed in the camp, Adequacy of first aid kit with required first aid medicine filled, Key Health (Malaria / dengue	Labour Camp	Weekly/ As per requirement	IFC benchmark standards for workers accommodation	EPC Contractor	AEGCL / PMC

[6]Here the frequency means the frequency for the monitoring report. The ground data collection frequency should refer to those in the ESMP.

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
		/ fever / any other) issues reported during the last month. Refer IFC Benchmark Standards for Workers Accommodation as **Appendix-5**					
Tower foundation, erection and stringing	Construction Stage	Use of PPEs at site, Toolbox talks prior to start of work, Availability of emergency contact numbers, Disposal of waste materials, Preparation and Implementation of Site Emergency Response Plan, Water consumption.	Transmission line	Monthly	As per specification and norms	EPC Contractor	AEGCL / PMC
Air Quality Monitoring	A. Pre-Construction Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind direction.	Near sensitive receptor sites	One time	National Air quality standards of CPCB	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind direction.	Same location as selected during pre-construction period	Twice a year	National Air quality standards of CPCB	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	C. Operation Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind direction.	Same location as selected during pre-construction period	One time	National Air quality standards of CPCB	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Noise Level	A. Pre-	Noise level (dB	Near	One Time	CPCB standards	EPC	AEGCL /

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
Monitoring	Construction Stage	level) On hourly basis for 24 hours	sensitive receptor sites		for Noise and vibrations	contractor by CPCB approved laboratory	PMC
	B. Construction Stage	Noise level (dB level) On hourly basis for 24 hours	Same location as selected during pre-construction period	Twice a year/ noise assessment by demand	CPCB standards for Noise and vibrations	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	C. Operation Stage	Noise level (dB level) On hourly basis for 24 hours	Same location as selected during pre-construction period	One Time	CPCB standards for Noise and vibrations	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Water Quality Monitoring	A. Pre-Construction Stage	As per IS: 10500 (PH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS Turbidity, Total hardness, (as CaCO3), corrosivity, Taste).	Near sensitive receptor sites	One time	National water quality standards of CPCB	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	As per IS:10500 {pH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total	Same location as selected during pre-construction period	Twice a year	National water quality standards of CPCB	EP EPC contractor C by CPCB approved laboratory	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
		pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS, Turbidity, Total hardness, (as CaCO3), corrosivity, Taste}.					
	C. Operation Stage	As per IS: 10500 (PH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS, Turbidity, Total hardness, (as CaCO3), corrosivity, Taste).	Same location as selected during pre-construction period	One Time	National water quality standards of CPCB	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Soil Quality Monitoring	A. Pre-Construction Stage	PH, Sulphate (SO3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content.	Near sensitive receptor sites	One time	Technical specifications	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	PH, Sulphate (SO3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content.	Same location as selected during pre-construction period	Twice a year	Technical specifications	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	C. Operation Stage	PH, Sulphate (SO3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Conten.t	Same location as selected during pre-construction period	One Time	Technical specifications	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
EMF	A. Pre-Construction Stage	Design specification	-	Once during final design approval	National Electrical Safety Code, American National Standard Institute, C2	Contractor (designing), PMC and PMU (design review)	AEGCL / PMC
	B. Construction Stage	Adherence to Design specification during construction work.	Transmission line routes	Continuous activity	National Electrical Safety Code, American National Standard Institute, C2	Contractor	AEGCL / PMC
	C. Operation Stage	Maintenance of conductor to ground, phase to phase and circuit to circuit clearances.	Transmission line routes	Continuous activity	National Electrical Safety Code, American National Standard Institute, C2	AEGCL – Field Staff	AEGCL / PMC
Carcass	A. Pre-Construction Stage	Visual inspection for transmission line locations	Transmission line routes	Continuous activity	Identification of carcass (animals/birds) to be reported to concerned forest/wildlife authority for identification of species. Record to be maintained for number of carcasses	Surveyor	AEGCL / PMC
	B. Construction Stage	Visual Physical Inspection for transmission line locations.	Transmission line routes	Continuous activity		Contractor	AEGCL / PMC
	C. Operation Stage	Visual Physical Inspection for transmission line locations	Transmission line routes	Continuous activity		AEGCL – Field Staff	AEGCL / PMC
Traffic	A. Pre-Construction Stage	Number & type of vehicles being used to access substation site.	Transmission line routes	Continuous activity	Record maintenance for being used for survey and increased traffic load in localities	Surveyor	AEGCL / PMC
	B. Construction Stage	Number & type of vehicle being used for material transportation by EPC contractor.	Transmission line routes	Continuous activity	Maintenance of Logbook for in-out time of vehicle on site (substation).	Contractor	AEGCL / PMC
	C. Operation Stage	Number & Type of vehicles being used for maintenance activity.	Transmission line routes	Continuous activity	Maintenance of Logbook for in-out time of vehicle on site (substation)	AEGCL – O&M staff	AEGCL / PMC
Tree cutting	A. Pre-Construction Stage	Enumeration of trees after finalization of	Transmission line routes	Once during detailed survey and	Documentary evidence to be maintained by	Surveyor	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
		layout plan of selected transmission line route.		layout design development	surveyor for counting of trees.		
	B. Construction Stage	Development of inventory of tress before initiating the transmission line construction.	Transmission line routes	During the construction phase	Marking of tress by revenue authority in presence of Contractor and AEGCL officials Obtaining applicable clearance from forest department.	Contractor / Revenue Department / AEGCL	AEGCL / PMC
	C. Operation Stage	Pruning/cutting of tress after getting prior permission from the competent authority for maintenance activity.	Transmission line routes	During the operation phase	Maintenance of record	AEGCL	AEGCL / PMC
Stakeholder Engagement	A. Pre-Construction Stage	Mapping of stakeholders	Transmission line routes	Continuous activity	Keep record of the Consultation with mapped stakeholders (Keep minutes of Consultation and attendance sheet)	Survey Consultant/ Concerned revenue circle	AEGCL / PMC
	B. Construction Stage	Listing of identified stakeholders (administrative and project affected people)	Transmission line routes	Continuous activity	Keep record of the Consultation with mapped stakeholders and PAPs (Keep the record MOM of Consultation and attendance sheet)	Contractor/PMC /AEGCL/ Concerned revenue circle	AEGCL / PMC
	C. Operation Stage	Identification of stakeholders	Transmission line routes	Continuous activity	Consultation with identified stakeholders has to be kept and the copy of minutes of Consultation	Contractor (Defect Liability Stage)/ AEGCL – Field Officers	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
					and attendance sheet also to be kept.		
Grievance Mechanism	A. Pre-Construction Stage	Identification of officials, NGO, stakeholders to be part Grievance redressal committee.	Transmission line routes	Continuous activity	Development of Grievance redresses mechanism as per provisions Notification of formulation of GRM and GRC.	AEGCL - PMU	AEGCL / PMC
	B. Construction Stage	Working files of GRC and GRM records.	Transmission line routes	Continuous activity	Notification of formulation of GRM and GRC and display of GRM procedure in project locations (in local language) keep records for GRM (if any)	Contractor, PMC, AEGCL – PMU, Revenue Concerned PIU, AEGCL – Field staff	GRC
	C. Operation Stage	Working files of GRC and GRM records.	Transmission line routes	Continuous	Notification of formulation of GRM and GRC and display of GRM procedure in project locations. Working records for GRM.	Concerned field staff, concerned PIU	AEGCL / PMC
Compensation	A. Pre-Construction Stage	Identification of project affected people	Transmission line routes	During identification of land parcel for tower base area and ROW of TL of impact	Compensation is to be paid as per RAP.	-	-
	B. Construction Stage	Mapping and listing of projects affected people (crop damage (if any area m^2), *zirat* damage (marking of trees & development of inventory), Restricted use of land (area m^2) –if applicable.	Transmission line routes			-	-
	C. Operation Stage	Marking of trees (enumeration) to		-		-	-

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
		where pruning/cutting is required to maintain clearance between trees and conductor after obtaining prior permission from the competent authority Damage to crop (area m^2 and Listing of the types of crop during Stringing of line.	Transmission line routes				
Livelihood	A. Pre-Construction Stage	Identification of any impact on livelihood due to Restricted use of land, crop damage and *zirat* damage.	Transmission line routes	Once during identification of land parcel for tower base area and ROW of TL	Compensation is to be paid as per RAP	Revenue Department & AEGCL - concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC
	B. Construction Stage	Identification of any impact on livelihood due to loss of land (area m^2) – land utilization pattern, crop damage (area m^2 and type of crop) and *zirat* damage (inventory development).	Transmission line routes	Once – before commencing construction work		Revenue Department & AEGCL - concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC
	C. Operation Stage	Identification of any impact on livelihood due to Restricted use of land, crop damage and zirat damage (inventory development).	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer, EPC Contractor (Defect Liability Stage)	AEGCL / PMC
Restoration	A. Pre-Construction Stage	Identification of any damage to public utilities and public/private property to be	Transmission line routes	Once during identification of land Parcel for tower	Compensation is to be paid as per RAP.	Revenue Department & AEGCL - concerned divisional	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[6]	Standards	Implementation	Supervision
		envisaged during construction phase.		base area and ROW of TL		officer, PMC, EPC Contractor	
	B. Construction Stage	Marking and listing of damage to public utilities / shifting of public utilities and public / private property.	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer, PMC	AEGCL / PMC
	C. Operation Stage (Defect Liability Stage)	Marking and listing of damage to public utilities / shifting of public utilities and public / private property.	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer	AEGCL / PMC

External Reporting and Communication

Project head is responsible for ensuring that communication with government agencies and stakeholders are maintained as per the requirement for obtaining various permission from line departments like-

- Communication to all concern Circle Office for approval of land scheduling report/compensation details of Tower footing and RoW.

10.6 BUDGET FOR IMPLEMENTATION OF ESMP SPECIFIC FOR ACTIVITIES COVERED BY THE ESIA – ESMP

The project will have its own budget for implementation of ESMP and RAP. The check survey for the proposed 400 kV Transmission Line associated with the Sonapur substation is completed. The tower foundation works/Civil work can only be initiated upon payment of compensation.

The budget heads for Construction and O&M stage will include cost towards

- Wastewater treatment;
- Personal protective equipment;
- Health & Safety; and
- Hazardous material transportation & disposal

ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor's good Engineering practice. An indicative budgetary allocation of **INR 546.85093 Lakhs** for ESMP implementation during Construction and O& M stage will be required for all the three LILO lines is provided in table below.

Table 10.5: Indicative Budgetary allocation for EMP Implementation

Sl. No.	Particulars	Capital Cost (Lump sum INR in Lakhs)	Recurring Cost (Lump sum INR in Lakhs) per Annum	Remarks
A. Construction Phase				
1.	Waste Management	**1.60**	**0.80**	Considered as part of EPC contractor work under Good Engineering Practice
2.	Environment, health and safety and Contractor's Environmental and Social Management Plan (CESMP) Implementation	**3.00**	**1.50**	
3.	EQMT	**2.0**	**1.0**	EQMT will be done for Air, water, Noise Level and soil by EPC Contractor.
4.	Management Plan (Biological environment) and Perch rejecter and power line markers	**1.50** Lakhs Lump sum	-	Considered as part of EPC contractor work under Good Engineering Practice for construction period under supervision of PMC and monitoring by AEGCL. AEGCL will take necessary measures during Operation period
6.	Compensatory afforestation (West Aprikola Reserve Forest)	**534.75093**		AEGCL already paid the amount towards CAMPA. **Enclosed in Appendix-17.**
7.	Compensatory afforestation	The cost for compensatory plantation, as determined during the process, will be deposited into the account of the competent authority upon their demand		During the assessment of zirat (immovable asset) value along the Right of Way (RoW) for transmission lines (T/Ls), the competent authority will conduct tree enumeration.
8.	**Resources**			
	PMU Two numbers Environmental Safeguard Specialist Two numbers Social Safeguard Specialist	-	-	Experts are on board from AEGCL fund.
	PMC One number Senior Environmental Safeguard Expert One number Senior Social Safeguard Expert	-	-	Experts are on board as part of PMC contract.

Sl. No.	Particulars	Capital Cost (Lump sum INR in Lakhs)	Recurring Cost (Lump sum INR in Lakhs) per Annum	Remarks
	Three numbers Environmental Investigation Officers Three numbers Social Investigation Officers			
	EPC One Environment, Health, Safety and Social Officer One Community Consultation Officer	-	-	Experts are on board as part of EPC contract.
	Sub – Total A	**542.85093**	**3.30**	
B. Operation and Maintenance Phase				
1.	Waste Management	**1.00**	**0.50**	
2.	Environment, health and safety and EMP Implementation	**2.00**	**1.00**	
3.	Facility Management for Housekeeping	**1.00**	**0.50**	
	Sub – Total B	**4.00**	**2.00**	
	Total (Sub – Total A + Sub – Total B)	**546.85093**	**5.30**	
	Social			
	Compensation for Livelihood restoration and CSR	As per RAP for the project		

Note: The above cost does not include cost of manpower needed for the EMP implementation.

10.7 INSTITUTIONAL ARRANGEMENT FOR MONITORING AND REPORTING

The Assam Intra-State Transmission System Enhancement Project (AISTSEP) is implemented by Assam Electricity Grid Corporation Limited (AEGCL) under the financial assistance from the Asian Infrastructure Investment Bank (AIIB). A Project Management Unit (PMU), established within the AEGCL, headed by a Project Director cum CGM (PP&D). The Project Director is accountable for overall supervision, coordination and responsibility of the project planning, implementation of the ESMP. The PMU will be supported by Project Implementation Units (PIUs) established at all divisional level. The PMC for the project will monitor the environmental and social aspects with the supervision of PMU's E&S special staff. The PMU's E&S staff and Divisional official at divisional level will supervise the contractor. Other environmental good practices include sanitary waste management, noise abatement, maintaining hygienic conditions, maintenance of fire and safety equipment.

10.8 Monitoring of ESMP compliance

The proposed mitigation measures comprise of conducting environmental monitoring for Air Quality, Noise Level, Soil Quality and Water Quality during Pre-construction, construction and operational phases of the project. The Environment and Social staff of AEGCL shall ensure the monitoring of the environmental and social aspects. During the construction phase, the contractor should ensure that activities like handling of earth works, disposal of debris, storage of materials, labour camps, putting proper traffic signals is done properly to have minimum impact on the environment and affected communities. The PMC for the project will monitor these parameters with the supervision of PMU's E & S officers. The PMU's E&S officers and Divisional official at divisional level will supervise the contractor. Other environmental good practices include sanitary waste management, noise abatement, maintaining hygienic conditions, maintenance of fire and safety equipment.

The Environmental and Social staff of PMU will ensure that site engineers and contractors adhere and comply with all measures and procedures identified in the ESMP. Activities to be monitored should include, but are not limited to:

- All planning, coordination and management activities related to the implementation of E&S safeguard issues;
- The identification of corrective and preventive actions;
- Records of health and safety matters and training activities;
- Consultations with project affected people (as and when needed, particularly during the implementation);
- Feedback, troubles hooting and project related grievances;
- Ensuring that livelihoods, where negatively impacted, are restored to pre-Project levels;
- Preparation of progress and monitoring reports as required by the funding agency, and
- Verifying the projects overall compliance with safeguard measures and its progress towards achieving the intended loan outcomes.

10.9 Monitoring of ESMoP Compliance

Environmental Parameters to Be Monitored: To ensure that project would not generate negative impacts to the environment and affected communities, monitoring of environmental and social parameters has to be performed by PMU- AEGCL and PMC as per contract provisions. The monitoring activities of the project include site supervision, verification of permits, monitoring of water quality, soil, noise and air, traffic disruptions, livelihood restorations, Occupational, Health and Safety, etc. Monitoring of the quality of water, soil, air and noise during the construction stage is the responsibility of the PMC. The ESMoP compliance will be monitored by E&S staff of PMU.

10.10 Reporting Line (from contractor to AIIB), report type and templates

The Environmental and Social (E&S) staff is dedicated to projects funded by the Asian Infrastructure Investment Bank (AIIB) to streamline decision-making and provide greater autonomy for project execution and delivery. The Environmental and Social staff of the AISTSE project under AEGCL is part of the Project

Management Unit (PMU), which is headed by the Project Director. At the divisional level, the responsibility of the E&S Officer is assigned to the concerned Assistant General Manager (AGM). The AGMs will also act as Project Managers for individual subprojects and will work under the supervision of the Deputy General Manager (DGM) at the circle level.

Mitigation measures related to construction as specified in the ESMP to be incorporated into civil works contracts, and their implementation will be primarily the responsibility of the contractors. Contractors are required to submit monthly progress report **(template in Appendix 6A)** on the implementation of ESMP measures to PMC/PMU. ESMP implementation will be evaluated internally by the PMU/PIU itself and the PMC E&S Expert and through field level officials, who will be regularly monitoring ESMP implementation.

Project Management Consultant (PMC) to keep everything on track and carryout evaluation on the ESMP implementation. The PMC will submit monthly progress report **(template in Appendix 6B)** to update the Project Management Unit (PMU) on the ESMP implementation activities. The E&S Experts of PMC will submit semi-annual environmental and social monitoring report **(template in Appendix 6C)** on progress and compliance issues of ESMP implementation. Progress reports will include a description of implementable activities and their status; identify the responsible parties involved in their implementation; and provide project management schedules and time frames for doing so, along with their associated costs.

The E&S Experts of PMU, AEGCL will ensure that the semi-annual monitoring report submitted by PMC is in the line with the requirement of AIIB and submit the environmental and social monitoring to AIIB.

The illustration of reporting line is provided in figure below.

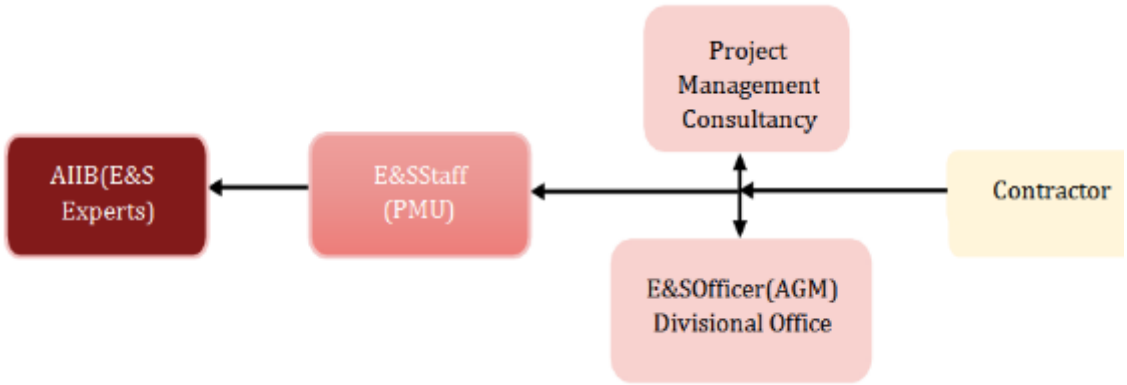


Figure-10.1: Illustration of Reporting Line

The environmental monitoring report will be submitted by the PMC - E&S staff to the PMU, which will include the result of environmental monitoring into its environmental report. The Environment and Social Staff of PMU after interaction with PMC E&S staff will ensure the adequacy of submitted monitoring reports and PMU will further submit these reports to AIIB twice in a yearsemi-annually. This report will demonstrate that soundprovide the status of the environmental and social risk management practices are applied, and the set environments targets are achieved.

In case the implementation of ESMP measures is not satisfactory, AEGCL may engage external qualified

experts to verify monitoring reports and assess the significant impacts and risks. These external monitoring experts shall recommend actions for AEGCL to enhance environmental compliance. Funding agency will continue to monitor project compliance with safeguard plans and requirements on an on-going basis throughout the duration of the contract.

10.11 Capacity building needs for this project

The AEGCL has Environmental & Social project staffs, who have knowledge of environmental safeguards, and experience of AIIB environmental safeguard policies and their implementation of AISTSEP. It is hence understood that they have required familiarity with AIIB environmental safeguard policies and its implementation. Designated PMU officials, and PIUs staffs and engineers will be trained by PMC safeguards experts on safeguards issues related to the project. The capacity building program which included modules on: (i) introduction and sensitization to AIIB environmental and social policy and requirements; (ii) project related requirements as provided in the ESMP; (iii) improved coordination within line departments; (iv) monitoring and reporting system; and (v) project GRM. Briefings on safeguards principles, GRM etc. will also be conducted to the contractors and PIU safeguard officers supported by PMC.

Training and capacity building programme are being conducted by PMC as per the requirement and PMC contract provision. The detail of training program is provided below:

Training Program for E&S officials of EPC contractor on the preparation of E&S checklists, Implementation of the Contractor's Environmental and Social Management Plan (CESMP) and proper documentation and record maintenance at the project site was conducted at PMC Office on 24th April, 2025.

Photographs of the training program

Dated-24.04.2025





Photo Plate 1 & 2: Training Provided to E&S staffs of EPC Contractor, Pkg-H

Apart from these, training and capacity building programme may be conducted by E&S team of AIIB to ensure implementation of E&S requirement.

11 SUMMARY, RECOMMENDATIONS AND CONCLUSION

Power transmission projects including the construction of substation and associated transmission line have not been listed in the list of environmentally sensitive projects and hence, no environmental clearance is required, as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments by the Ministry of Environment, Forest and Climate Change (MoEF&CC). However, project associated activity like quarry operation (if any) for the project may require prior Environmental Clearance. Clearance from the Forest Department is required only in cases where a project is constructed on forest land or requires cutting of forest trees. Clearance from the State Wildlife Board (SBWL) / National Wildlife Board (NWBL) is required only in cases where a project is constructed on Notified Wildlife area or within the Eco-sensitive Zone of Wildlife area. Clearance from the Wetland authority is required only in cases where a project is constructed on Notified Wetland or within the Eco-sensitive Zone of Wetland. Based on the screening, forest, wildlife and wetland clearances are not applicable for Transmission Lines.

As the Project is funded through the AIIB, the Bank's Environmental and Social Policy (ESP) applies. The Project has been assigned to "Category B" as per the ESP, as the Transmission lines are not located in sensitive areas.

ESS 1 is applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

ESS 2 is applicable and accordingly Abbreviated Resettlement Action Plan/Resettlement Action Plan (ARAP/RAP) will be prepared, finalized and disclosed before commencement of works.

ESS 3 A total of seventy-eight (78) households belonging to the Scheduled Tribe (Plains) community are currently identified as affected by the Project. Additional ST households may be identified following the completion of the census survey within the RoW. The nature of impacts on these households is assessed as minor, temporary, and primarily economic, consisting mainly of crop loss and temporary restrictions on land use within the RoW. Although the Project area does not fall within a Sixth Schedule area under the Constitution of India, the presence of Boro (Bodo), Garo, and Karbi ST households is noted. These groups are recognized as distinct Indigenous communities, possessing their own languages, cultural traditions (including festivals such as Bwisagu), and customary social institutions (e.g., traditional village councils). Accordingly, they meet the defining characteristics of Indigenous Peoples as set out under AIIB Environmental and Social Framework (ESF) 2024 – ESS 3. Based on the above assessment and in accordance with the requirements of ESS 3 (Indigenous Peoples), the ESS 3 is triggered for this Project. However, given the limited and temporary nature of impacts, ESS 3 requirements be addressed through proportionate measures integrated into the Project's Resettlement Action Plan (RAP) and ESIA/ESMP.

The various environmental and social attributes were identified through primary field study and

secondary information's.

Various alternatives have been considered for selection of most optimal route of transmission lines.

The Environmental and Social Impact Assessment (ESIA) for the transmission line system has evaluated the likely environmental and social impacts during both construction and operation phases. The assessment concludes that the impacts are generally limited in nature, few in number, site-specific, and largely reversible. Furthermore, these impacts can be effectively mitigated with appropriate measures.

Importantly, the ESIA emphasizes that forested and ecologically sensitive areas, such as National Parks and Wildlife Sanctuaries, have been avoided through careful route selection, adhering to the principle of minimizing harm. The check survey for the Transmission line is completed; however, approval of the land scheduling report from concerned Revenue Circle is awaited.

Remedial measures for climate risks have been adapted for Transmission Line at design stage.

The community consultations are carried out in all the villages along the transmission line corridor with local habitants where Sixty-five participants were participated in the 400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line in Kamrup (Metro) district such as economically weak communities, women, vulnerable groups and other local community leaders nearby the proposed transmission line. Consultation will be continued during implementation of the project.

For unwanted situation like danger, sexual harassment and other life threatening, the victim person may reach to the concerned officials who belong to the Tier-1 and Tier-2 committee and may contact for further needful action or the matter should be informed to AIIB immediately.

ESMP for identified impacts and the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored and Environmental and Social Monitoring program has been detailed in the main report.

ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor's good Engineering practice. An amount of **INR 546.85093 Lakhs** is estimated to be required for implementation of ESMP. Further, there is budget for RAP implementation which is included in the RAP.

Institutional Arrangement for Monitoring and Reporting Assam Intra-State Transmission System Enhancement Project (AISTSEP) including Reporting Line (from contractor to AIIB) is in place and detailed in the main report.

Capacity building programmes are being conducted by PMC as per the requirement and PMC contract provision. Apart from these, training and capacity building programme are being conducted by E&S team of AIIB to ensure implementation of E&S requirement.

In summary, the ESMP provides a structured approach to ensuring that the temporary impacts during construction are minimized, while also maximizing the positive benefits, such as local employment opportunities, through effective management and monitoring.

It is recommended to implement all the mitigation measures outlined in Environmental and Social Management Plan, monitor Environmental and Social Monitoring Plan, continuous public consultation and maintaining GRM.

In conclusion, the potential impacts identified in the ESIA study are manageable and can be mitigated effectively through compensation, preventive measures, and careful planning during the construction phase.

SOME SITE PHOTOGRAPHS OF THE TRANSMISSION LINE ROUTES DURING SITE VISIT

400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line



AP-60



AP-52



AP- 43



AP-40



AP- 18



AP- 11

Source: Site Visit

APPENDIX 1- TECHNICAL DETAILS

ASSAM ELECTRICITY GRID CORPORATION LIMITED
Regd. Office: 1st floor, Bijulee Bhawan, Paltan Bazar, Guwahati-781001
CIN: U40101AS2003SGC007238
Phone: 0361-2739520/ Fax: 0361-2739513 Web: www.aegcl.co.in

AEGCL

No: AEGCL/GM (P&D)/AIIB/Package-H(R)/Sonapur TLs /453 Date: 11/4/2025

3795
22/4/25

GM (RAP)
23/4/

To

The Chief General Manager (PP&D)
AEGCL, Bijulee Bhawan
Paltan Bazar, Guwahati-01

Sub: *Approval of 400kV tower spotting data, sag tension calculation, wind pressure calculation and ECD drawing fo Sonapur GIS against AIIB funded Pkg -H(R)*

Ref: *1) Letter from M/s Techno no. AEGCL/Pkg-H(R)/SONAPUR/TL-001 dated 17/03/2025*
2) Mail from this end dated 26/03/2025
3) Letter from this end no. AEGCL/GM (P&D)/AIIB/Package-H(R)/Sonapur TLs/378 dated 26/03/2025
4) Mail from this end dated 05/04/2025
5) Mail from M/s Techno dated 29/03/2025, hardcopies received on dated 05/04/2025
6) Mail from M/s Techno dated 10/04/2025

Madam,

With reference to the above, the 400kV tower spotting data, sag tension calculation, wind pressure calculation ar ECD drawing (B, C, D and DF type) for Sonapur GIS against AIIB funded Pkg -H(R), submitted by M/s Techno Electric ar Engineering Co. ltd. have been checked and approved subject to the comment mentioned.

Moreover, for A type tower, it is seen that the phase-phase clearance (horizontal) is less than 15000mm (which is as per BID/IS Hence clarification sought.

Further, comments from PMC may be collected from their end.

This is for favour of your kind information and necessary action please.

Enclosed: 1 set duly approved as above

Yours faithfully

11/4/25

General Manager (P&D)
AEGCL, Bijulee Bhawan Campus,
Paltan Bazar, Guwahati-01

Memo No. AEGCL/GM (P&D)/AIIB/Package-H(R)/Sonapur TLs Date: / /2025

Copy to

1) The Team Leader, PMC, AEGCL, PT feedback Infra ltd for information.

Received
28/04/25

General Manager (P&D)
AEGCL, Bijulee Bhawan Campus,
Paltan Bazar, Guwahati-01

General Manager, Planning & Design AEGCL
Bijulee Bhawan Campus, Paltan Bazar, Guwahati-781001, Assam
Phone: 0361-2550422 (O), Email: designcell@aegcl.co.in

APPENDIX 2A- TECHNICAL DETAILS

KALPA-TARU POWER TRANSMISSION LIMITED
GANDHINAGAR, INDIA

SAG TENSION CALCULATION (WIND ZONE - 5)

PURCHASER : ~~KOHIMA-MARIANI TRANSMISSION LIMITED~~ AEGCL

PROJECT : 400kV D/C LINES WITH TWIN MOOSE CONDUCTOR OR EQUIVALENT AAAC CONDUCTOR
1) IMPHAL (MANIPUR) - NEW KOHIMA (NAGALAND)
2) NEW KOHIMA (NAGALAND) - NEW MARIANI (ASSAM)
" NORTH EASTERN REGION STRENGTHENING SCHEME"
(NERSS-VI)
PKG- H(R).

REFERENCE : 1) Share purchase agreement dated 31.03.2017
2) EPC LOI Ref no. KMTL/17-18/Contracts/01, dated 19th May-2017

DOCUMENT : SAG TENSION CALCULATION (WIND ZONE - 5)

Reliability level- 1; Terrain category- 2 ;Wind zone- 5 (50 m/s)
Max Temp - 85°C

SHEET	DESCRIPTION
1-6	SAG TENSION CALCULATION (WIND ZONE - 5) (Up to +9m Body extension)

Team Leader
PT. Feedback Infra
Indonesia

TRACTEBEL ENGINEERING PVT. LTD. CONSULTING ENGINEERS, GURGAON, INDIA
P.011404 : Kohima - Mariani 400 kV Transmission Line
APPROVAL STATUS:
A1: APPROVED
A2: APPROVED WITH COMMENT(RESUBMIT)
A3: NOT APPROVED
I : FOR INFORMATION/REFERENCE
DEPARTMENT: T & D
DATE: 11.09.2017
Project Manager

REV. NO.	REVISION DESCRIPTION	DATE
R0	FIRST SUBMISSION	15-Jun-17

REV. NO.	APPROVAL	CAT
R0	Approved as per letter P.00XXXX/KMTL/C/02 dated 26.07.17	A1

DESIGNED BY : PARTH DESAI	DESIGN : 318 / SAG - 2
CHECKED BY : KAUSHAL THAKKAR	SHEETS : 6
APPROVED BY : NITIN PATEL	REVISION : R0

APPROVED, subject to the condition that the approval conveyed herein neither relieves the contractor of his contractual obligations and his responsibilities, design details, performance particulars and conformity of the supplies with the Indian Statutory laws / IEC specifications as may be applicable, nor does limit the AEGCL's right under the contract

Checked By AM (P&D)	Checked By DM (P&L)	Checked By AGM (P&D)	Checked By DGM (P&D)	Approved By GM (P&D)

KALPATARU POWER TRANSMISSION LTD.
GANDHINAGAR, INDIA

DESIGN : 318 / SAG-2
NERSS - VI

SAG TENSION CALCULATION

400 kV D/C; Twin ACSR MOOSE; WZ-5 (50 m/sec)

Wire		UNIT	CONDUCTOR	EARTHWIRE	OPGW - 24 Fibre
Span	L	m	400	400	400
Make			ACSR	GSW	
Name / Product			MOOSE	7/3.66	
Overall Diameter	D	cm	3.177	1.098	1.2
Area	A	cm²	5.97	0.7365	0.735
Unit weight	Wt	kg/m	2.004	0.583	0.455
Ultimate strength	T	kg	16437.2	6974.6	9469.9
Young's modulus	E	kg/cm²	7.035E+05	1.933E+06	1.430E+06
Coefficient of expansion	α	/°C	1.93E-05	1.15E-05	1.38E-05
Factor 'G'	Wt/A	kg/m/cm²	0.33568	0.79158	0.61905
Factor 'Z'	(L*G)²*E/24		5.285E+08	8074807954	3652318931
Factor 'X'	L²*G/8		6713.56784	15831.6361	12380.95238
Starting case					
Temperature		°C	32	0	0
Wind Pressure	Wind	kg/m²	0	0	0
K calculation by FOS/LOAD/SAG			FOS	SAG	SAG
FOS/LOAD/SAG Required			4.545	8.697	8.697
Wind Pressure / length	Y=Wind*D kg/m		0	0	0
Load factor ²	Q²=1+(Y/WT)²		1	1	1
Working stress	F1=Q*K/S kg/m²		605.7274	1820.3639	1423.5950
	F1=T/A*FOSR or				
	F1= LOADR/A				
Factor 'K'	F1-Z*Q²/F1³		-834.77507	-616.4131	-378.5750

Team Leader
PT. Feedback Infra
Indonesia

CALCULATION FOR TOP CONDUCTOR			ACSR MOOSE								
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32
wind pressure		kg/m²	0	179	134.25	0	0	136.928	92.624	152.785	112.664	167.009
Tension in Wire		kg	**3616**	**8643**	**7157**	**4148**	**3023**	**7247**	**5750**	**7779**	**6426**	**8250**
Stress in Wire		kg/cm²	605.7	1447.8	1198.8	694.7	506.4	1213.9	963.2	1303.0	1076.4	1382.0
% Use			22.0%	52.6%	43.5%	25.2%	18.4%	44.1%	35.0%	47.3%	39.1%	50.2%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			**4.5450**	**1.902**	**2.297**	**3.963**	**5.437**	**2.268**	**2.858**	**2.113**	**2.558**	**1.992**
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	**11.083**			**9.663**	**13.257**					

CALCULATION FOR MIDDLE CONDUCTOR			ACSR MOOSE								
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32
wind pressure		kg/m²	0	172	129	0	0	131.573	89.001	146.811	108.259	160.478
Tension in Wire		kg	**3616**	**8414**	**6980**	**4148**	**3023**	**7067**	**5629**	**7579**	**6277**	**8034**
Stress in Wire		kg/cm²	605.7	1409.5	1169.1	694.7	506.4	1183.7	943.0	1269.5	1051.5	1345.8
% Use			22.0%	51.2%	42.5%	25.2%	18.4%	43.0%	34.2%	46.1%	38.2%	48.9%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			**4.5450**	**1.953**	**2.355**	**3.963**	**5.437**	**2.326**	**2.920**	**2.169**	**2.619**	**2.046**
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	**11.083**			**9.663**	**13.257**					
Sag PARABOLA		m	11.083			9.663	13.257					

CALCULATION FOR BOTTOM CONDUCTOR			ACSR MOOSE								
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32
wind pressure		kg/m²	0	163	122.25	0	0	124.688	84.344	139.129	102.594	152.081
Tension in Wire		kg	**3616**	**8118**	**6751**	**4148**	**3023**	**6834**	**5475**	**7321**	**6086**	**7755**
Stress in Wire		kg/cm²	605.7	1359.8	1130.9	694.7	506.4	1144.7	917.1	1226.3	1019.4	1299.0
% Use			22.0%	49.4%	41.1%	25.2%	18.4%	41.6%	33.3%	44.5%	37.0%	47.2%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			**4.5450**	**2.025**	**2.435**	**3.963**	**5.437**	**2.405**	**3.002**	**2.245**	**2.701**	**2.120**
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	**11.083**			**9.663**	**13.257**					

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KALPATARU POWER TRANSMISSION LTD.
GANDHINAGAR, INDIA

DESIGN : 318 / SAG-2
NERSS - VI

SAG TENSION CALCULATION

400 kV D/C; Twin ACSR MOOSE; WZ-5 (50 m/sec)

Wire		UNIT	CONDUCTOR	EARTHWIRE	OPGW - 24 Fibre
Span	L	m	400	400	400
Make			ACSR	GSW	
Name / Product			MOOSE	7/3.66	ZTT 24B1-73 [92.5;39.9]
Overall Diameter	D	cm	3.177	1.098	1.2
Area	A	cm²	5.97	0.7365	0.735
Unit weight	Wt	kg/m	2.004	0.583	0.455
Ultimate strength	T	kg	16437.2	6974.6	9469.9
Young's modulus	E	kg/cm²	7.036E+05	1.933E+06	1.430E+06
Coefficient of expan	α	/°C	1.93E-05	1.15E-05	1.38E-05
Factor 'G'	Wt/A	kg/m/cm²	0.33568	0.79158	0.61905
Factor 'Z'	(L*G)²*E/24		5.285E+08	8074807954	3652318931
Factor 'X'	L²*G/8		6713.56784	15831.6361	12380.95238
Starting case					
Temperature		°C	32	0	0
Wind Pressure	Wind	kg/m²	0	0	0
K calculation by	FOS/LOAD/SAG		FOS	SAG	SAG
FOS/LOAD/SAG Required			4.545	8.697	8.697
Wind Pressure / leng	Y=Wind*D	kg/m	0	0	0
Load factor ²	Q²=1+(Y/WT)²		1	1	1
Working stress	F1=Q*X/S/ or F1=T/A*FOSR or F1= LOADR/A	kg/m²	605.7274	1820.3639	1423.5950
Factor 'K'	F1-Z*Q³/F1²		-834.77507	-616.4131	-378.5750

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CALCULATION FOR EARTHWIRE			GSW 7/3.66								
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	53° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind
Temperature		°C	32	32	32	0	53	32	32	32	32	32
wind pressure		kg/m²	0	222	166.5	0	0	169.821	114.874	189.488	139.729	207.128
Tension in Wire		kg	**1213**	**3606**	**2974**	**1341**	**1144**	**3013**	**2347**	**3241**	**2653**	**3441**
Stress in Wire		kg/cm²	1647.4	4896.5	4037.8	1820.4	1553.1	4090.8	3187.4	4400.4	3602.7	4671.9
% Use			17.4%	51.7%	42.6%	19.2%	16.4%	43.2%	33.7%	46.5%	38.0%	49.3%
Maximum % Use Allowed			20 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			**5.75**	**1.93**	**2.35**	**5.20**	**6.10**	**2.32**	**2.97**	**2.15**	**2.63**	**2.03**
Factor of safety Required			5.000	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	**9.610**			**8.697**	**10.194**					
% Sag of Earthwire to Sag of Co		%	**87%**			**90%**	**77%**					

CALCULATION FOR OPGW - 24 Fibre			OPGW - 24 Fibre ZTT 24B1-73 [92.5;39.9]								
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	53° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind
Temperature		° C	32	32	32	0	53	32	32	32	32	32
wind pressure		kg/m²	0	222	166.5	0	0	169.821	114.874	189.488	139.729	207.128
Wind pressure / length		kg/m	0.000	2.664	1.998	0.000	0.000	2.038	1.378	2.274	1.677	2.486
Load factor ²			1.000	35.280	20.283	1.000	1.000	21.060	10.179	25.975	14.580	30.841
Working load		kg	**931**	**3481**	**2858**	**1046**	**870**	**2897**	**2229**	**3122**	**2539**	**3319**
Working stress		kg/cm²	1266.6	4735.7	3888.7	1423.6	1183.5	3941.4	3032.6	4247.8	3453.9	4515.2
% Use			9.8%	36.8%	30.2%	11.0%	9.2%	30.6%	23.5%	33.0%	26.8%	35.0%
Maximum % Use Allowed			20 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %
Factor of safety			**10.172**	**2.721**	**3.313**	**9.051**	**10.887**	**3.269**	**4.249**	**3.033**	**3.730**	**2.854**
Factor of safety Required			5.000	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500
Sag		m	**9.775**			**8.697**	**10.462**					
% Sag of OPGW to Sag of Condu		%	**88%**			**90%**	**79%**					

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Kalpataru Power Transmission Ltd Gandhinagar, India			DESIGN : 318 / SAG-2 NERSS - VI
WIND PRESSURE CALCULATION AT TOP CONDUCTOR & EW/OPGW			
• Reliability level	1		
Return period of Design Load	50	Year	From Table:1 IS-802
Reliability level	**RL-1**		
• Wind zone	5		
Basic wind speed Vb	50	m/s	Cl. No 8.1 IS-802
	180	kmph	
• Reference wind speed V_R = Vb/1.375	36.364	m/s	
Risk coefficient K1	1.00		From Table:2 IS-802
• Terrain Category	2		
Terrain Roughness Coefficient K2	1.00		From Table:3 IS-802
• Design wind speed Vd = V_R * K1 *K2	36.36	m/s	
• Design wind pressure Pd = 0.6 * Vd^2 =	0.6*36.36²		
Pd =	**793.404**	N/m^2	
=	81.0	kg/m^2	(Rounded up)
• Normal Span	400	m	

• **Calculation for average height**	Top Conductor	GW	Insulator at Top Conductor	
Earthwire to Top Cross-arm	0	4.250		m
Top Cross-arm to Middle Cross-arm	8.000	8.000	8.000	m
Middle Cross-arm to Bottom Cross-arm	8.000	8.000	8.000	m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300	26.300	m
Muff	0.225	0.225	0.225	m
Extension height	9.000	9.000	9.000	m
Total	51.525	55.775	51.525	m
GW Suspension Clamp Length		0.150		m
Min. Suspension Insulator + Hanger+ BM	3.961			m
Sag for Min. Temp & Nil Wind	9.663	8.697		m
2/3 of above value	6.442	5.798		m

• Average Height of Top Conductor 51.525-3.9605-6.4422
41.122 m

• Average Height of Earthwire/Groundwire 55.775-5.798-0.15
49.827 m

• Average Height of Insulator at Top x-arm 51.525 m

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Kalpataru Power Transmission Ltd Gandhinagar, India	DESIGN : 318 / SAG-2 NERSS - VI

WIND PRESSURE CALCULATION AT TOP CONDUCTOR & EW/OPGW

- **Wind Pressure on TOP CONDUCTOR**

Drag coefficient Cdc	1.0	
Average height of conductor	41.122 m	
Gust Response Factor for conductor Gc	2.210	From Table:7 IS-802
Wind pressure on conductor inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1*2.21 1753.4228 N/m² **178.79** kg/m² Say, 179.0 kg/m²	

- **Wind Pressure on GROUND WIRE / OPGW**

Drag coefficient Cdc	1.2	
Average height of ground wire	49.827 m	
Gust Response Factor for ground wire Gc	2.284	From Table:7 IS-802
Wind pressure on ground wire inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1.2*2.284 2174.5617 N/m² **221.74** kg/m² Say, 222.0 kg/m²	

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- **Wind Pressure on INSULATOR at Top Conductor**

Drag coefficient Cdi	1.2	
Average height of insulator	51.525 m	
Gust Response Factor for insulator Gi	2.491	From Table:6 IS-802
Wind pressure on insulator inclusive of drag & gust factor	Pd * Cdi * Gi 793.404*1.2*2.491 2371.6432 N/m² **241.83** kg/m² Say, 242.0 kg/m²	

- **Narrow Front Wind Pressure on Tower**

Basic wind speed , Vb	=	50 m/s	180 kmph
Reference wind Speed, Vr	=	1.5*Vb	
	=	50*1.5 m/s	
Vr	=	**75.0** m/s	270.0 kmph
Narrow front Design Wind speed, Vd	=	Vr*K1*K2	
	=	75*1*1	
	=	**75** m/s	
Design Wind pressure on tower	=	0.6*(Vd)²	**On Insulator**
	=	3375.0 N/m²	**414.0** kg/m²
	Say,	345.0 kg/m²	

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Kalpataru Power Transmission Ltd Gandhinagar, India		DESIGN : 318 / SAG-2 NERSS - VI
WIND PRESSURE CALCULATION AT MIDDLE CONDUCTOR		
• **Calculation for average height**	Middle Conductor	Insulator at Middle Conductor
Earthwire to Top Cross-arm	0	m
Top Cross-arm to Middle Cross-arm	0	0 m
Middle Cross-arm to Bottom Cross-arm	8.000	8.000 m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300 m
Muff	0.225	0.225 m
Extension height	9.000	9.000 m
Total	43.525	43.525 m
Sag for Min. Temp & Nil Wind	9.663	m
2/3 of above value	6.442	m
• Average Height of Middle Conductor	43.525-3.9605-6.4422	
	33.122 m	
• Average Height of Insulator at Middle x-arm	43.525 m	
• **Wind Pressure on MIDDLE CONDUCTOR**		
Drag coefficient Cdc	1.0	
Average height of conductor	33.122 m	
Gust Response Factor for conductor Gc	2.114	From Table:7 IS-802
Wind pressure on conductor	Pd * Cdc * Gc	
inclusive of drag & gust factor	793.404*1*2.114	
	1677.2561 N/m²	
	171.03 kg/m²	
Say,	172.0 kg/m²	
• **Wind Pressure on INSULATOR at Middle Conductor**		
Drag coefficient Cdi	1.2	
Average height of insulator	43.525 m	
Gust Response Factor for insulator Gi	2.428	From Table:6 IS-802
Wind pressure on insulator	Pd * Cdi * Gi	
inclusive of drag & gust factor	793.404*1.2*2.428	
	2311.6619 N/m²	
	235.72 kg/m²	
Say,	236.0 kg/m²	

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Kalpataru Power Transmission Ltd
Gandhinagar, India

DESIGN : 318 / SAG-2
NERSS - VI

WIND PRESSURE CALCULATION AT BOTTOM CONDUCTOR

• **Calculation for average height**	Bottom Conductor	Insulator at Bottom Conductor	
Earthwire to Top Cross-arm	0		m
Top Cross-arm to Middle Cross-arm	0	0	m
Middle Cross-arm to Bottom Cross-arm	0	0	m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300	m
Muff	0.225	0.225	m
Extension height	9.000	9.000	m
Total	35.525	35.525	m
Sag for Min. Temp & Nil Wind	9.663		m
2/3 of above value	6.442		m

• Average Height of Bottom Conductor 35.525-3.9605-6.4422
25.122 m

• Average Height of Insulator at Bottom x-arm 35.525 m

• **Wind Pressure on CONDUCTOR**

Drag coefficient Cdc	1.0	
Average height of conductor	25.122 m	
Gust Response Factor for conductor Gc	2.014	From Table:7 IS-802
Wind pressure on conductor inclusive of drag & gust factor	Pd * Cdc * Gc	
	793.404*1*2.014	
	1597.9157 N/m²	
	162.94 kg/m²	
Say,	163.0 kg/m²	

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• **Wind Pressure on INSULATOR**

Drag coefficient Cdi	1.2	
Average height of insulator	35.525 m	
Gust Response Factor for insulator Gi	2.355	From Table:6 IS-802
Wind pressure on insulator inclusive of drag & gust factor	Pd * Cdi * Gi	
	793.404*1.2*2.355	
	2242.1597 N/m²	
	228.63 kg/m²	
Say,	229.0 kg/m²	

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KALPA-TARU® POWER TRANSMISSION LIMITED
GANDHINAGAR, INDIA

SAG TENSION CALCULATION UP TO +25 M EXTN (WIND ZONE - 5)

PURCHASER : ~~KOHIMA-MARIANI TRANSMISSION LIMITED~~ AEGCL

PROJECT : 400kV D/C LINES WITH TWIN MOOSE CONDUCTOR OR EQUIVALENT AAAC CONDUCTOR
1) IMPHAL (MANIPUR) - NEW KOHIMA (NAGALAND)
2) NEW KOHIMA (NAGALAND) - NEW MARIANI (ASSAM)
" NORTH EASTERN REGION STRENGTHENING SCHEME"
(NERSS-VI)
PKY-H(R)

REFERENCE : 1) Share purchase agreement dated 31.03.2017
2) EPC LOI Ref no. KMTL/17-18/Contracts/01, dated 19th May-2017

DOCUMENT : SAG TENSION CALCULATION UP TO +25 M EXTN (WIND ZONE - 5)

Reliability level- 1; Terrain category- 2 ;Wind zone- 5 (50 m/s)
Max Temp - 85°C

SHEET	DESCRIPTION
1-6	SAG TENSION CALCULATION UP TO +25 M EXTN (WIND ZONE - 5) (Up to +25m Body extension)

REV. NO.	REVISION DESCRIPTION	DATE
R0	FIRST SUBMISSION	18-Dec-17
R1	REVISED AS PER LETTER NO. P.011404/KMTL/C/038, DATED ON 02-01-2018	5-May-18

REV. NO.	APPROVAL	CAT

DESIGNED BY : JANICE MECWAN
CHECKED BY : KAUSHAL THAKKAR
APPROVED BY : NITIN PATEL

DESIGN : 318 / SAG - 4
SHEETS : 6
REVISION : R1

Team Leader
PT. Feedback Infra
Indonesia

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KALPATARU POWER TRANSMISSION LTD.
GANDHINAGAR, INDIA

DESIGN : 318 / SAG-4
NERSS - VI

SAG TENSION CALCULATION

400 kV D/C; Twin ACSR MOOSE; WZ-5 (50 m/sec)

Wire		UNIT	CONDUCTOR	EARTHWIRE	OPGW - 24 Fibre
Span	L	m	300	300	300
Make			ACSR	GSW	
Name / Product			MOOSE	7/3.66	
Overall Diameter	D	cm	3.127	1.098	1.2
Area	A	cm²	5.97	0.7365	0.735
Unit weight	Wt	kg/m	2.004	0.533	0.455
Ultimate strength	T	kg	10437.2	6574.6	9469.9
Young's modulus	E	kg/cm²	7.033E+05	1.90E+06	1.40E+06
Coefficient of expansion	α	/°C	1.93E-05	1.15E-05	1.38E-05
Factor 'G'	Wt/A	kg/m/cm²	0.33568	0.72358	0.61905
Factor 'Z'	(L*G)²*E/24		2.973E+08	4542079474	2054429399
Factor 'K'	L²*G/8		3776.38191	8905.29532	6964.28571
Starting case					
Temperature		°C	32	0	0
Wind Pressure	Wind	kg/m²	0	0	0
K calculation by	FOS/LOAD/SAG		FOS	SAG	SAG
FOS/LOAD/SAG Required			4.545	4.510	4.510
Wind Pressure / length	Y=Wind*D,	kg/m	0	0	0
Load factor ²	Q²=1+(Y/Wt)²		1	1	1
Working stress	F1=Q*X/SA	kg/cm²	605.7274	1974.4155	1544.0692
	F1=T/A*FOSR or F1= LOADR/A				
Factor 'K'	F1-Z*Q²/F1²		-204.55525	609.2764	682.3661

CALCULATION FOR TOP CONDUCTOR			ACSR MOOSE											
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind	32° - 0.98296 wind	32° - 0.69976 wind	32° - 0.73722 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32	32	32	32
wind pressure		kg/m²	0	200	150	0	0	152.992	103.490	170.710	125.882	186.602	196.6	140.0	147.4
Tension in Wire		kg	3616	8487	7109	4499	2764	7193	5777	7688	6423	8124	8395	6824	7037
Stress in Wire		kg/cm²	605.7	1421.6	1190.8	753.5	462.9	1204.9	967.6	1287.8	1075.7	1360.9	1406.2	1143.1	1178.7
% Use			22.0%	51.6%	43.2%	27.4%	16.8%	43.8%	35.1%	46.8%	39.1%	49.4%	51.1%	41.5%	42.8%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			4.5450	1.937	2.312	3.654	5.947	2.285	2.845	2.138	2.560	2.023	1.958	2.409	2.336
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	6.234			5.011	8.157								

CALCULATION FOR MIDDLE CONDUCTOR			ACSR MOOSE											
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind	32° - 0.98296 wind	32° - 0.69976 wind	32° - 0.73722 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32	32	32	32
wind pressure		kg/m²	0	195	146.25	0	0	149.167	100.903	166.442	122.735	181.937	191.7	136.5	143.8
Tension in Wire		kg	3616	8352	7003	4499	2764	7085	5702	7570	6331	7997	8262	6724	6932
Stress in Wire		kg/cm²	605.7	1399.0	1173.0	753.5	462.9	1186.8	955.2	1267.9	1060.5	1339.5	1383.9	1126.4	1161.2
% Use			22.0%	50.8%	42.6%	27.4%	16.8%	43.1%	34.7%	46.1%	38.5%	48.7%	50.3%	40.9%	42.2%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			4.5450	1.968	2.347	3.654	5.947	2.320	2.883	2.171	2.596	2.055	1.989	2.444	2.371
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	6.234			5.011	8.157								
Sag PARABOLA		m	6.234			5.011	8.157								

CALCULATION FOR BOTTOM CONDUCTOR			ACSR MOOSE											
Case Description			32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	85° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind	32° - 0.98296 wind	32° - 0.69976 wind	32° - 0.73722 wind
Temperature		°C	32	32	32	0	85	32	32	32	32	32	32	32	32
wind pressure		kg/m²	0	187	140.25	0	0	143.048	96.763	159.614	117.700	174.473	183.8	130.9	137.9
Tension in Wire		kg	3616	8135	6833	4499	2764	6912	5583	7379	6186	7792	8048	6564	6765
Stress in Wire		kg/cm²	605.7	1362.7	1144.5	753.5	462.9	1157.8	935.2	1236.0	1036.2	1305.2	1348.1	1099.6	1133.1
% Use			22.0%	49.5%	41.6%	27.4%	16.8%	42.1%	34.0%	44.9%	37.6%	47.4%	49.0%	39.9%	41.2%
Maximum % Use Allowed			22 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety			4.5450	2.021	2.406	3.654	5.947	2.378	2.944	2.228	2.657	2.110	2.042	2.504	2.430
Factor of safety Required			4.545	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag		m	6.234			5.011	8.157								

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KALPATARU POWER TRANSMISSION LTD.
GANDHINAGAR, INDIA

DESIGN : 318 / SAG-4
NERSS - VI

SAG TENSION CALCULATION

400 kV D/C; Twin ACSR MOOSE; WZ-5 (50 m/sec)

Wire		UNIT	CONDUCTOR	EARTHWIRE	OPGW - 24 Fibre
Span	L	m	300	300	300
Make			ACSR	GSW	
Name / Product			MOOSE	7/3.66	
Overall Diameter	D	cm	3.177	1.098	1.2
Area	A	cm²	5.97	0.7265	0.755
Unit weight	Wt	kg/m	2.004	0.583	0.455
Ultimate strength	T	kg	10457.2	6474.0	9403.8
Young's modulus	E	kg/cm²	7.03E+05	1.93E+06	1.49E+06
Coefficient of expan	α	/°C	1.93E-05	1.15E-05	1.38E-05
Factor 'G'	Wt/A	kg/m/cm²	0.33568	0.79158	0.61905
Factor 'Z'	(L*G)²*E/24		2.97E+08	4542079474	2054429399
Factor 'K'	L²*G/8		3776.38191	8905.29532	6964.28571
Starting case					
Temperature		°C	32	0	0
Wind Pressure	Wind	kg/m²	0	0	0
K calculation by	FOS/LOAD/SAG		FOS	SAG	SAG
FOS/LOAD/SAG Required			4.545	4.510	4.510
Wind Pressure / leng	Y=Wind*D, kg/m		0	0	0
Load factor²	Q²=1+(Y/WT)²		1	1	1
Working stress	F1=Q*X/Skg/m² F1=T/A*FOSR or F1=LOADR/A		605.7274	1974.4153	1544.0692
Factor 'K'	F1-Z*Q²/F1²		-204.55525	809.2704	682.0681

GSW 7/3.66

CALCULATION FOR EARTHWIRE													
Case Description		32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	53° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind	0° - 0.98296 wind	0° - 0.62941 wind & no ice	0° - 0.76496 wind & no ice
Temperature	°C	32	32	32	0	53	32	32	32	32	32	0	0	0
wind pressure	kg/m²	0	243	182.25	0	0	185.885	125.740	207.413	152.947	226.721	238.9	152.9	185.9
Tension in Wire	kg	**1244**	**3439**	**2876**	**1454**	**1136**	**2911**	**2313**	**3114**	**2589**	**3292**	**3589**	**2780**	**3100**
Stress in Wire	kg/cm²	1689.4	4669.4	3905.0	1974.4	1541.6	3952.4	3140.7	4228.4	3515.3	4470.0	4872.4	3774.1	4208.6
% Use		17.8%	49.3%	41.2%	20.8%	16.3%	41.7%	33.2%	44.7%	37.1%	47.2%	51.5%	39.9%	44.4%
Maximum % Use Allowed		20 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %	70 %
Factor of safety		**5.61**	**2.03**	**2.43**	**4.80**	**6.14**	**2.40**	**3.02**	**2.24**	**2.69**	**2.12**	**1.94**	**2.51**	**2.25**
Factor of safety Required		5.000	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429	1.429
Sag	m	**5.271**			**4.510**	**5.776**								
% Sag of Earthwire to Sag of Cor	%	**85%**			**90%**	**71%**								

OPGW - 24 Fibre ZTT 24B1-73 [92.9;99.9]

CALCULATION FOR OPGW - 24 Fibre														
Case Description		32° - Nil wind	32° - Full wind	32° - 0.75 wind	0° - Nil wind	53° - Nil wind	32° - 0.76496 wind	32° - 0.51745 wind	32° - 0.85355 wind	32° - 0.62941 wind	32° - 0.93301 wind	0° - 0.98296 wind	0° - 0.62941 wind & no ice	0° - 0.76496 wind & no ice
Temperature	°C	32	32	32	0	53	32	32	32	32	32	0	0	0
wind pressure	kg/m²	0	243	182.25	0	0	185.885	125.740	207.413	152.947	226.721	238.9	152.9	185.9
Wind pressure / length	kg/m	0.000	2.916	2.187	0.000	0.000	2.231	1.509	2.489	1.835	2.721	2.866	1.835	2.231
Load factor²		1.000	42.073	24.103	1.000	1.000	25.034	11.997	30.923	17.271	36.754	40.685	17.271	25.034
Working load	kg	**947**	**3262**	**2712**	**1135**	**853**	**2746**	**2152**	**2945**	**2428**	**3119**	**3390**	**2595**	**2911**
Working stress	kg/cm²	1288.5	4438.5	3689.3	1544.1	1161.0	3735.9	2927.3	4007.3	3303.1	4243.8	4612.0	3530.0	3960.8
% Use		10.0%	34.4%	28.6%	12.0%	9.0%	29.0%	22.7%	31.1%	25.6%	32.9%	35.8%	27.4%	30.7%
Maximum % Use Allowed		20 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %	40 %
Factor of safety		**9.399**	**2.903**	**3.492**	**8.346**	**11.098**	**3.449**	**4.401**	**3.215**	**3.901**	**3.036**	**2.794**	**3.650**	**3.253**
Factor of safety Required		5.000	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500
Sag	m	**5.405**			**4.510**	**5.999**								
% Sag of OPGW to Sag of Condu	%	**87%**			**90%**	**74%**								

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Kalpataru Power Transmission Ltd Gandhinagar, India			DESIGN : 318 / SAG-4 NERSS - VI
WIND PRESSURE CALCULATION AT TOP CONDUCTOR & EW/OPGW			
• Reliability level	1		
Return period of Design Load	50	Year	From Table:1 IS-802
Reliability level	**RL-1**		
• Wind zone	5		
Basic wind speed Vb	50	m/s	Cl. No 8.1 IS-802
	180	kmph	
• Reference wind speed V_R = Vb/1.375	36.364	m/s	
Risk coefficient K1	1.00		From Table:2 IS-802
• Terrain Category	2		
Terrain Roughness Coefficient K2	1.00		From Table:3 IS-802
• Design wind speed Vd = V_R * K1 *K2	36.36	m/s	
• Design wind pressure Pd = 0.6 * Vd^2 =	0.6*36.36²		
Pd =	**793.404**	N/m^2	
=	81.0	kg/m^2	(Rounded up)
• Normal Span	300	m	

• **Calculation for average height**	Top Conductor	GW	Insulator at Top Conductor	
Earthwire to Top Cross-arm	0	4.250		m
Top Cross-arm to Middle Cross-arm	8.000	8.000	8.000	m
Middle Cross-arm to Bottom Cross-arm	8.000	8.000	8.000	m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300	26.300	m
Muff	0.225	0.225	0.225	m
Extension height	25.000	25.000	25.000	m
Total	67.525	71.775	67.525	m
GW Suspension Clamp Length		0.150		m
Min. Suspension Insulator + Hanger+ BM	4.006			m
Sag for Min. Temp & Nil Wind	5.011	4.510		m
2/3 of above value	3.341	3.007		m

• Average Height of Top Conductor 67.525-4.006-3.341
60.178 m

• Average Height of Earthwire/Groundwire 71.775-3.0067-0.15
68.618 m

• Average Height of Insulator at Top x-arm 67.525 m

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Kalpataru Power Transmission Ltd Gandhinagar, India			DESIGN : 318 / SAG-4 NERSS - VI
WIND PRESSURE CALCULATION AT TOP CONDUCTOR & EW/OPGW			
• **Wind Pressure on TOP CONDUCTOR**			
Drag coefficient Cdc	1.0		
Average height of conductor	60.178 m		
Gust Response Factor for conductor Gc	2.461		From Table:7 IS-802
Wind pressure on conductor inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1*2.461 1952.5672 N/m² **199.10** kg/m² Say, 200.0 kg/m²		
• **Wind Pressure on GROUND WIRE / OPGW**			
Drag coefficient Cdc	1.2		
Average height of ground wire	68.618 m		
Gust Response Factor for ground wire Gc	2.503		From Table:7 IS-802
Wind pressure on ground wire inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1.2*2.503 2383.0683 N/m² **243.00** kg/m² Say, 243.0 kg/m²		
• **Wind Pressure on INSULATOR at Top Conductor**			
Drag coefficient Cdi	1.2		
Average height of insulator	67.525 m		
Gust Response Factor for insulator Gi	2.610		From Table:6 IS-802
Wind pressure on insulator inclusive of drag & gust factor	Pd * Cdi * Gi 793.404*1.2*2.61 2484.9413 N/m² **253.38** kg/m² Say, 254.0 kg/m²		
• **Narrow Front Wind Pressure on Tower**			
Basic wind speed , Vb	=	50 m/s	180 kmph
Reference wind Speed, Vr	= 1.5*Vb = 50*1.5 m/s Vr = **75.0** m/s		270.0 kmph
Narrow front Design Wind speed, Vd	= Vr*K1*K2 = 75*1*1 = **75** m/s		
Design Wind pressure on tower	= 0.6*(Vd)² = 3375.0 N/m² Say, 345.0 kg/m²		**On Insulator** **414.0** kg/m²

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Kalpataru Power Transmission Ltd Gandhinagar, India		DESIGN : 318 / SAG-4 NERSS - VI
WIND PRESSURE CALCULATION AT MIDDLE CONDUCTOR		
• **Calculation for average height**	Middle Conductor	Insulator at Middle Conductor
Earthwire to Top Cross-arm	0	m
Top Cross-arm to Middle Cross-arm	0	0 m
Middle Cross-arm to Bottom Cross-arm	8.000	8.000 m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300 m
Muff	0.225	0.225 m
Extension height	25.000	25.000 m
Total	59.525	59.525 m
Sag for Min. Temp & Nil Wind	5.011	m
2/3 of above value	3.341	m
• Average Height of Middle Conductor	59.525-4.006-3.341 52.178 m	
• Average Height of Insulator at Middle x-arm	59.525 m	
• **Wind Pressure on MIDDLE CONDUCTOR**		
Drag coefficient Cdc	1.0	
Average height of conductor	52.178 m	
Gust Response Factor for conductor Gc	2.386	From Table:7 IS-802
Wind pressure on conductor inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1*2.386 1893.0619 N/m² **193.03** kg/m² Say, 195.0 kg/m²	
• **Wind Pressure on INSULATOR at Middle Conductor**		
Drag coefficient Cdi	1.2	
Average height of insulator	59.525 m	
Gust Response Factor for insulator Gi	2.547	From Table:6 IS-802
Wind pressure on insulator inclusive of drag & gust factor	Pd * Cdi * Gi 793.404*1.2*2.547 2424.96 N/m² **247.27** kg/m² Say, 248.0 kg/m²	

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Kalpataru Power Transmission Ltd Gandhinagar, India		DESIGN : 318 / SAG-4 NERSS - VI
WIND PRESSURE CALCULATION AT BOTTOM CONDUCTOR		
• **Calculation for average height**	Bottom Conductor	Insulator at Bottom Conductor
Earthwire to Top Cross-arm	0	m
Top Cross-arm to Middle Cross-arm	0	0 m
Middle Cross-arm to Bottom Cross-arm	0	0 m
Bottom Cross-arm to Normal Tower C.L.	26.300	26.300 m
Muff	0.225	0.225 m
Extension height	25.000	25.000 m
Total	51.525	51.525 m
Sag for Min. Temp & Nil Wind	5.011	m
2/3 of above value	3.341	m
• Average Height of Bottom Conductor	51.525-4.006-3.341 44.178 m	
• Average Height of Insulator at Bottom x-arm	51.525 m	
• **Wind Pressure on CONDUCTOR**		
Drag coefficient Cdc	1.0	
Average height of conductor	44.178 m	
Gust Response Factor for conductor Gc	2.310	From Table:7 IS-802
Wind pressure on conductor inclusive of drag & gust factor	Pd * Cdc * Gc 793.404*1*2.31 1832.7632 N/m² **186.88** kg/m² Say, 187.0 kg/m²	
• **Wind Pressure on INSULATOR**		
Drag coefficient Cdi	1.2	
Average height of insulator	51.525 m	
Gust Response Factor for insulator Gi	2.491	From Table:6 IS-802
Wind pressure on insulator inclusive of drag & gust factor	Pd * Cdi * Gi 793.404*1.2*2.491 2371.6432 N/m² **241.83** kg/m² Say, 242.0 kg/m²	

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KALPA-TARU POWER TRANSMISSION LIMITED
GANDHINAGAR, INDIA

TOWER SPOTTING DATA (WIND ZONE - 5)

PURCHASER : ~~KOHIMA-MARIANI TRANSMISSION LIMITED~~ AEGCL

PROJECT : 400kV D/C LINES WITH TWIN MOOSE CONDUCTOR OR EQUIVALENT AAAC CONDUCTOR
1) IMPHAL (MANIPUR) - NEW KOHIMA (NAGALAND)
2) NEW KOHIMA (NAGALAND) - NEW MARIANI (ASSAM)
" NORTH EASTERN REGION STRENGTHENING SCHEME"
(NERSS-VI)
PKG-H(R)

REFERENCE : 1) Share purchase agreement dated 31.03.2017
2) EPC LOI Ref no. KMTL/17-18/Contracts/01, dated 19th May-2017

DOCUMENT : TOWER SPOTTING DATA (WIND ZONE - 5)

Reliability level- 1; Terrain category- 2 ;Wind zone- 5 (50 m/s)
Max Temp - 85°C

SHEET	DESCRIPTION
1-3	TOWER SPOTTING DATA (WIND ZONE - 5)

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REV. NO.	REVISION DESCRIPTION	DATE
R0	FIRST SUBMISSION	30-Aug-17
R1	TOWER SPOTTING DATA ADDED FOR DD5 UPTO +25M BE	29-May-18

REV. NO.	APPROVAL	CAT
R0	Approved as per letter P.011404/KMTL/C/06 dated 06.09.17	A1

DESIGNED BY	: VATSAL MISTRY	DESIGN :	318 / TSD - 2
CHECKED BY	: KAUSHAL THAKKAR	SHEETS :	3
APPROVED BY	: NITIN PATEL	REVISION :	R1

APPROVED, subject to the condition that the approval conveyed herein neither relieves the contractor of his contractual obligations and his responsibilities as per details performance parameters, design details supplies ...

KALPATARU POWER TRANSMISSION LIMITED
GANDHINAGAR, GUJARAT, INDIA

DESIGN: 318 / TSD-2

TOWER SPOTTING DATA

400 kV Twin ACSR Moose, Wind Zone-5

Sr. No.	General Details	DA5+9 m		DB5+9 m		DC5+9 m		DD5+9 m	
1	Angle of Deviation	0°-2°		0°-15°		15°-30°		30°-60°	
2	Vertical Load limitation on weight span (For both GW & conductor)								
		Down-ward	Down-ward	Down-ward	Up-ward	Down-ward	Up-ward	Down-ward	Up-ward
1]	On both spans(m)	600	200	1000	-1000	1000	-1000	1500	-1000
2]	On One Span (m)	360	100	600	-600	600	-600	900	-850
3	Permissible sum of adjacent spans in meters for various deviation angles. (subject to availability of minimum specified live metal clearances available) Permissible one span for various deviation angles should not exceed 60% of the value shown for sum of adjacent span.	Devi. Angle °	Span (m)	Devi. Angle °	Span (m)	Devi. Angle °	Span (m)	Devi. Angle °	Span (m)
		2	800	15	800	30	800	60	800
		1	824	14	843	29	842	59	838
		0	848	13	886	28	884	58	876
				12	930	27	927	57	914
				11	974	26	969	56	953
				10	1017	25	1012	55	991
				9	1061	24	1055	54	1030
				8	1105	23	1098	53	1069
				7	1148	22	1141	52	1109
				6	1192	21	1184	51	1148
				5	1200	20	1200	50	1188
				& below		& below		49	1200
								& below	

4 Minimum Clearances at Maximum temperature (85°C for ACSR-Moose conductor)
Vertical distances:

a)	Minimum Ground Clearance from Power Conductor	8.84	m
b)	For power line crossing up to 400 kV	5.49	m
c)	For power line crossing 500 kV	6.79	m
d)	For power line crossing 765 kV	7.94	m
e)	Telecommunication line	4.88	m
f)	Railway line: Above track	17.90	m
	Above crane	6.00	m
g)	River crossing (non navigable)	6.40	m

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5 Permissible sum of adjacent spans in meters for various deviation angles furnished in 3 above is applicable for conductor, earth-wire and OPGW.

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KALPATARU POWER TRANSMISSION LIMITED
GANDHINAGAR, GUJARAT, INDIA

DESIGN: 318 / TSD-2

TOWER SPOTTING DATA
400 kV Twin ACSR Moose, Wind Zone-5

Sr. No.	General Details			DD5 +12, +15, +18, +25 m Extn	
1	Angle of Deviation			30°-55°	
2	Vertical Load limitation on weight span (For both GW & conductor)				
				Down- ward	Up- ward
1]	On both spans(m)			1500	-1000
2]	On One Span (m)			900	-850
3	Permissible sum of adjacent spans in meters for various deviation angles. (subject to availability of minimum specified live metal clearances available) Permissible one span for various deviation angles should not exceed 60% of the value shown for sum of adjacent span.			Devi. Angle °	Span (m)
				55	600
				54	637
				53	674
				52	711
				51	749
				50	786
				49	824
				48	862
				47	900
				& below	
4	Permissible sum of adjacent spans in meters for various deviation angles furnished in 3 above is applicable for conductor, earth-wire and OPGW.				

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KALPATARU POWER TRANSMISSION LIMITED
GANDHINAGAR
INDIA

DESIGN: 318 / TSD-2

TOWER SPOTTING DATA

GENERAL DETAILS:

A) ELECTRICAL CLEARANCE FOR RAILWAY CROSSING

- Minimum Clearance between lowest point of 400 kV line conductor at maximum Sag and Rail level shall be 17.90 m.
- The crossing span shall be limited to 300 m.
- The crossing shall normally be at right angle to the railway track.
- Crossing should be done with DD type tower.
- The minimum distance of crossing tower shall be at least equal to the height of tower plus 6.0 m away measured from centre of the nearest railway track.

B) TELE-COMMUNICATION LINE CROSSING

- The angle of tele-communication line crossing shall be as near to 90° as possible. However, deviation to the extent of 30° may be permitted under exceptionally difficult situations.
- When, the angle of crossing has to be below 60°; the matter will be referred to the authority in charge of the telecommunication system. On a request from the contractor the permission of the telecommunication authority may be obtained by the Owner.
- In the crossing span, power line support will be as near the telecommunication line as possible, to obtain increased vertical clearance between the wires.

C) The number of consecutive spans between the section points shall not exceed 15 or 5 km. In plain terrain, and 10 spans or 3 km. in hilly terrain.

D) A section point shall comprise of tension point with DB type or DC type or DD type towers as applicable.

E) Minimum ground clearance required : 8840 mm

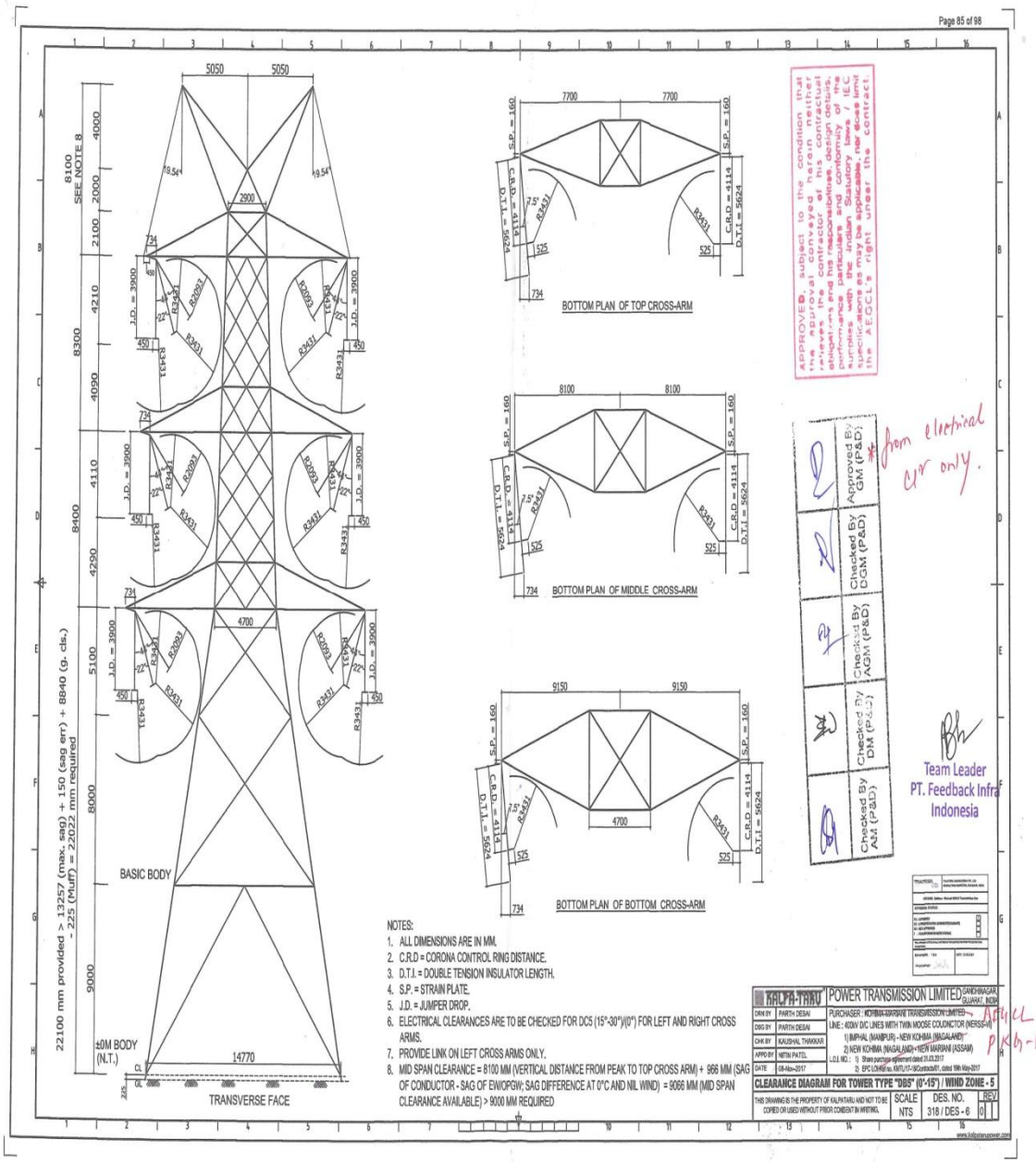
F) At all important road crossings, tension tower to be used.
For all national highway crossing, tension tower is to be used and the crossing span is not to exceed 250 meters.

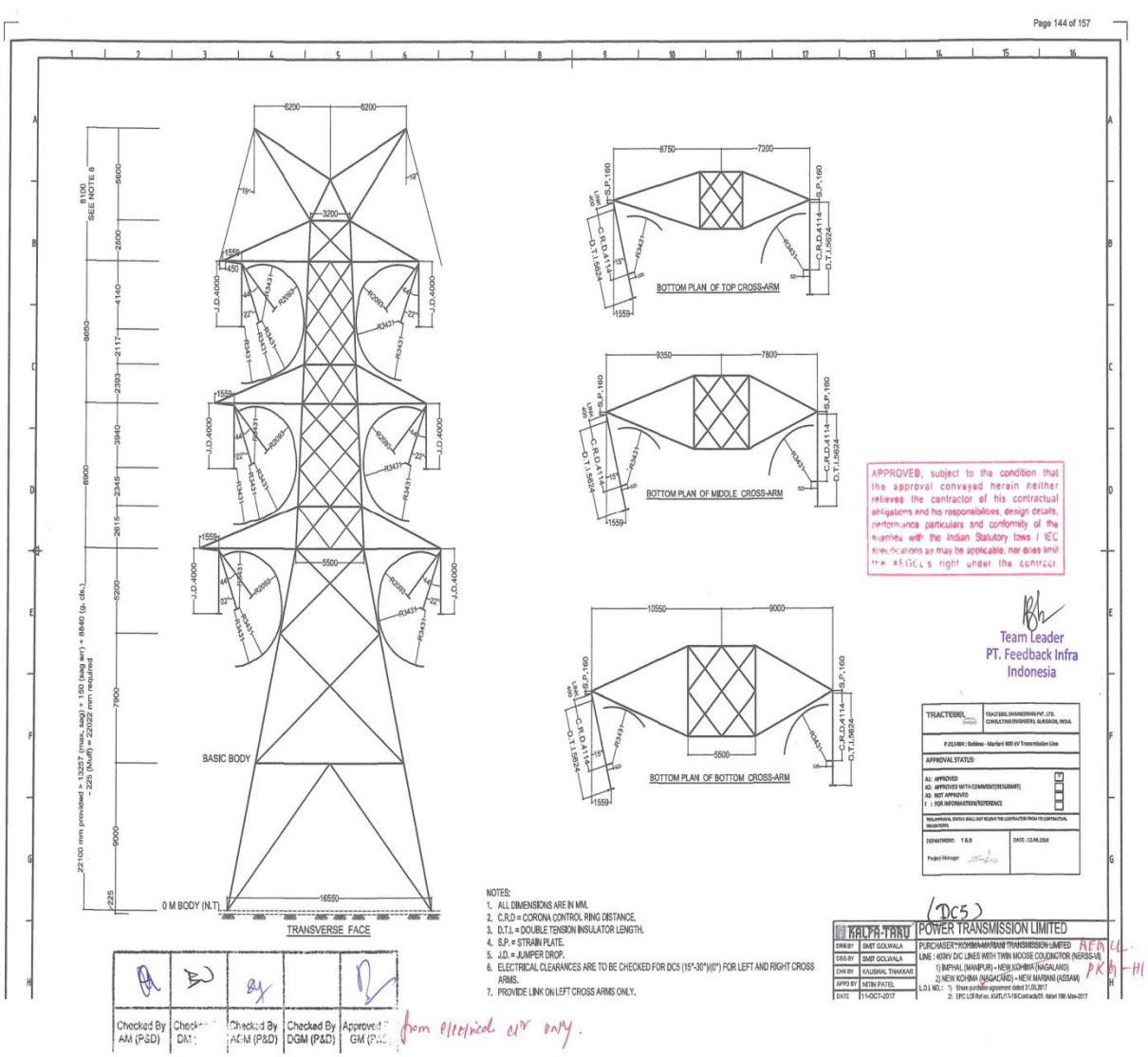
G) Maximum span of adjacent spans for various angles of deviation are subject to the condition that minimum specified live Metal Clearance & minimum Ground Clearance are available.

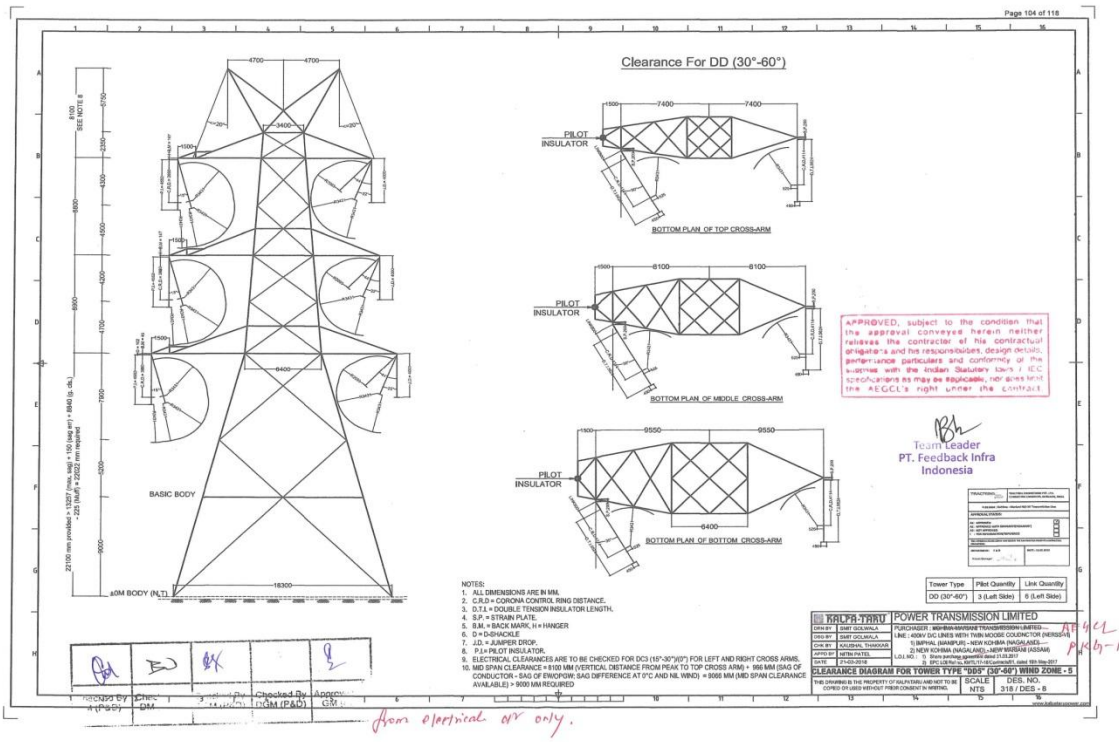
H) Maximum deviation of line for dead end tower shall be 15° Both side i.e. line side and sub-station side (slack span side)

I) The clearances from building, trees, Power line crossings should be made in accordance with Indian Electricity Rules, 2005 and IS:5613.

APPENDIX 2B- DRAWING OF DA, DB, DC and DD TOWER TYPE




Page 144 of 157
TRANSVERSE FACE
BASIC BODY
0 M BODY (N.T.)
BOTTOM PLAN OF TOP CROSS-ARM
BOTTOM PLAN OF MIDDLE CROSS-ARM
BOTTOM PLAN OF BOTTOM CROSS-ARM
APPROVED, subject to the condition that the approval conveyed herein neither relieves the contractor of his contractual obligations and his responsibilities, design details, performance particulars and conformity of the supplies with the Indian Statutory laws / IEC specifications as may be applicable, nor does limit the AEGCL's right under the contract.
Team Leader
PT. Feedback Infra
Indonesia
NOTES:
1. ALL DIMENSIONS ARE IN MM.
2. C.R.D = CORONA CONTROL RING DISTANCE.
3. D.T.I. = DOUBLE TENSION INSULATOR LENGTH.
4. S.P. = STRAIN PLATE.
5. J.D. = JUMPER DROP.
6. ELECTRICAL CLEARANCES ARE TO BE CHECKED FOR DC5 (15°-30°)(0°) FOR LEFT AND RIGHT CROSS ARMS.
7. PROVIDE LINK ON LEFT CROSS ARMS ONLY.
(DC5)
KALPA-TARU
POWER TRANSMISSION LIMITED
PURCHASER: KOHIMA-MARIANI TRANSMISSION LIMITED
LINE : 400kV D/C LINES WITH TWIN MOOSE COUDMOTOR (NERSS-VI)
1) IMPHAL (MANIPUR) - NEW KOHIMA (NAGALAND)
2) NEW KOHIMA (NAGALAND) - NEW MARIANI (ASSAM)
DRN BY SMIT GOLWALA
CHK BY KAUSHAL THAKKAR
APPD BY NITIN PATEL
DATE 11-OCT-2017
Checked By AM (P&D)
Checked By DM
Checked By ACM (P&D)
Checked By DGM (P&D)
Approved By GM (P&D)
from electrical clr only.


Page 104 of 118
Clearance For DD (30°-60°)
PILOT INSULATOR
BOTTOM PLAN OF TOP CROSS-ARM
BOTTOM PLAN OF MIDDLE CROSS-ARM
BOTTOM PLAN OF BOTTOM CROSS-ARM
BASIC BODY
APPROVED, subject to the condition that the approval conveyed herein neither relieves the contractor of his contractual obligations and his responsibilities, design details, performance particulars and conformity of the supplies with the Indian Statutory laws / IEC specifications as may be applicable, nor does limit the AEGCL's right under the contract.
Team Leader
PT. Feedback Infra
Indonesia
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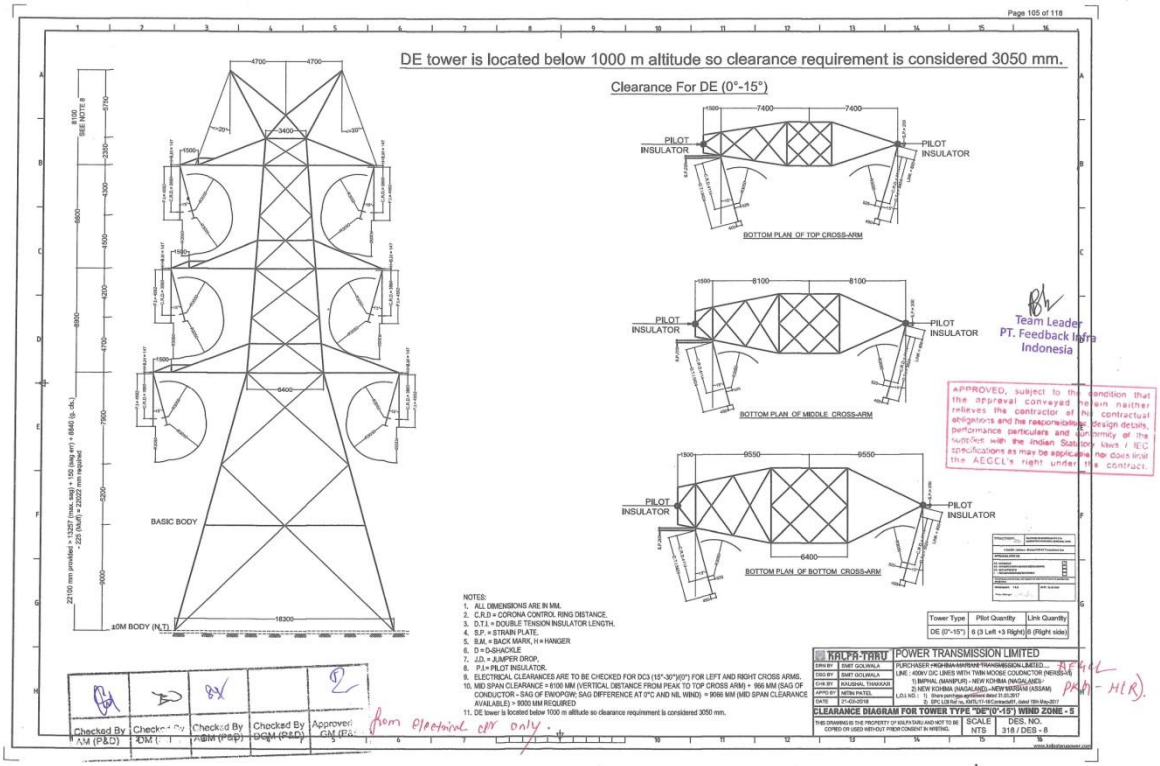
3. D.T.I = DOUBLE TENSION INSULATOR LENGTH.
4. S.P. = STRAIN PLATE.
5. B.M. = BACK MARK, H = HANGER
6. D = D-SHACKLE
7. J.D. = JUMPER DROP.
8. P.I.= PILOT INSULATOR.
9. ELECTRICAL CLEARANCES ARE TO BE CHECKED FOR DC3 (15°-30°)(0°) FOR LEFT AND RIGHT CROSS ARMS.
10. MID SPAN CLEARANCE = 8100 MM (VERTICAL DISTANCE FROM PEAK TO TOP CROSS ARM) + 966 MM (SAG OF CONDUCTOR - SAG OF EW/OPGW; SAG DIFFERENCE AT 0°C AND NIL WIND) = 9066 MM (MID SPAN CLEARANCE AVAILABLE) > 9000 MM REQUIRED
Tower Type | Pilot Quantity | Link Quantity
DD (30°-60°) | 3 (Left Side) | 6 (Left Side)
KALPA-TARU POWER TRANSMISSION LIMITED
CLEARANCE DIAGRAM FOR TOWER TYPE "DD3" (30°-60°) WIND ZONE - 5
SCALE NTS | DES. NO. 318 / DES - 8
from electrical dir only.


Page 105 of 118
DE tower is located below 1000 m altitude so clearance requirement is considered 3050 mm.
Clearance For DE (0°-15°)
PILOT INSULATOR
BOTTOM PLAN OF TOP CROSS-ARM
BOTTOM PLAN OF MIDDLE CROSS-ARM
BOTTOM PLAN OF BOTTOM CROSS-ARM
BASIC BODY
APPROVED, subject to the condition that the approval conveyed herein neither relieves the contractor of his contractual obligations and his responsibilities, design details, performance particulars and conformity of the supplies with the Indian Statutory laws / IEC specifications as may be applicable, nor does limit the AEGCL's right under the contract.
Team Leader
PT. Feedback Infra
Indonesia
NOTES:
1. ALL DIMENSIONS ARE IN MM.
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3. D.T.I = DOUBLE TENSION INSULATOR LENGTH.
4. S.P. = STRAIN PLATE.
5. B.M. = BACK MARK, H = HANGER
6. D = D-SHACKLE
7. J.D. = JUMPER DROP.
8. P.I.= PILOT INSULATOR.
9. ELECTRICAL CLEARANCES ARE TO BE CHECKED FOR DC3 (15°-30°)(0°) FOR LEFT AND RIGHT CROSS ARMS.
10. MID SPAN CLEARANCE = 8100 MM (VERTICAL DISTANCE FROM PEAK TO TOP CROSS ARM) + 966 MM (SAG OF CONDUCTOR - SAG OF EW/OPGW; SAG DIFFERENCE AT 0°C AND NIL WIND) = 9066 MM (MID SPAN CLEARANCE AVAILABLE) > 9000 MM REQUIRED
11. DE tower is located below 1000 m altitude so clearance requirement is considered 3050 mm.
Tower Type | Pilot Quantity | Link Quantity
DE (0°-15°) | 6 (3 Left +3 Right) | 6 (Right side)
KALPA-TARU POWER TRANSMISSION LIMITED
CLEARANCE DIAGRAM FOR TOWER TYPE "DE" (0°-15°) WIND ZONE - 5
SCALE NTS | DES. NO. 318 / DES - 8
from electrical dir only.

APPENDIX 3A- STANDARD OPERATING (WORK) PROCEDURE TOWER ERECTION

PURPOSE:

This document describes the step wise work procedure to carry out the Erection work of 11-132 / 220 / 400 / 765 kV D/C, 800 kV HVDC or other kind of Transmission Line work in planned and controlled manner with reference to the drawings, technical specification and standards.

SCOPE:

This includes Tower Erection for all Types of Towers substructure works as indicated on Technical Specification / Drawing. The work shall be carried out in accordance with the specification and corresponding approved drawings.

EQUIPMENT:

- Derrick Pole
- Poly Propylene Ropes - 12 to 32 mm dia. (Depending on the requirement)
- Winch and Tirfor
- Chain blocks, Single way Pulley, Hammer, Ring Spanner, D Spanner, Box Spanner, Drift Pins
- Safety Belts
- Helmets
- Crow Bar
- Portable Welding Machine
- Mobile Crane

CONSTRUCTION SEQUENCE:

The later stated construction sequence is followed for the complete erection of tower, for which certain checks are necessary which are as under stated.

- Material is to be sent to the sites of erection (as per tower schedule) from store with proper indent.
- Indent shall contain the following information –
- Type of tower
- No. of towers.
- Extension, if any
- Type of tower to be erected shall be identified from the Foundation check report / Tower schedule & the same to be sent to the required location.
- Site to be visited for checking the condition (accessibility of vehicles, water level, ROW issue, etc.)
- Forecast for weather conditions to be checked.
- Checking of foundation oldness with respect to the foundation report.
- Towers shall be erected after the concrete is at least 14 days old, but a gap of 28 days shall be preferred. (IS5613-3-2 14.1). Unless special procedures or technique are followed for early erection.

METHODS FOR ERECTION

Towers shall be erected by any suitable method in the sequence best adapted to the equipment, workers' experience and site conditions which will not overstress structure members.

Generally, there are three main methods of erection of steel transmission towers which are described as below:

1) Air Erection (Erection by Helicopter / Drone)
2) Erection thru Mobile Crane
3) Manual Erection with Gin pole / Derrick.

Manual Erection by Gin Pole

This method contains erection of tower by using a gin pole & then lifting the parts or panels accordingly. A gin pole is a boom of steel or aluminium pipe, wood pole or latticed truss secured at its base and usually inclined at a slight angle to the vertical. Generally, the lifting is done in any or combination of the two ways.

1) Built Up or Piece Meal Method

This method is most commonly used for the erection of 132 kV, 220 kV and 400 kV transmission line towers due to the following advantages:

- Tower materials can be supplied to site in knocked down condition, i.e., in pieces which facilitates easier and cheaper transportation.
- It does not require any heavy machinery such as cranes, etc.
- Tower erection activity can be done in any kind of terrain and throughout most of the year.
- Availability of workmen at cheaper rates.

This method consists of erecting the tower member by member.

The tower members are first set out and kept on the ground serially according to erection sequence to avoid time loss due to searching for them as and when required. In order to maintain speed and efficiency, a small assembly party can be sent ahead of the main erection gang for sorting out the tower members, keeping the members in correct position on the ground and assembling those panels on the ground which can be erected as a complete unit. The main corner leg members are prepared by fitting all cleats / plates for joints & bracings and step bolts.

The erection progresses from the bottom upwards. More than one leg section of each corner leg may be bolted together at the ground and erected in case they are short in length and light in weight. The main legs of the tower to be attached to the stub would be lifted by individual pieces and fixed with the stubs using the cleats, plates and bolts as per the drawing.

Since the legs are not self-supported at this stage, they would be anchored individually using guyed ropes diagonally. After erections of each leg ensure that the guy must be supported by 32mm crowbar & the angle of guy must be 30°-45° degree from horizontal. After this the lattices & bracings are lifted and joint with each other. This completes erection of base structure (leg extension or body extension).

Then the gin pole is to be attached to a suitable corner. With the help of hook provided on gin pole's base the leg & pole are fixed together on a support strut. Proper care shall be taken to provide soft/cushioning material between the pole & leg member to avoid abrading of galvanizing due to friction & pressure.

The top of a single gin pole is kept in the centre of the structure by suspending it from the leg members at any elevation using guys & temporary ground anchors. Two wire-guys about 60° to 90° apart in the plan view are attached to the top of the gin pole to resist or support the load to be lifted.

For safety, a third, and preferably a fourth guy, is installed in front to prevent the pole from falling over backward in the event of an unexpected impact or the sudden release of load. It is recommended to use 10t capacity turn buckle at the guying support. For smaller base towers / vertical configuration towers, one derrick / gin pole is used. For wide based towers and if one assembled section / panel of the tower is to be erected, then two derricks / gin poles are placed, one each on the top of diagonally opposite corner legs.

A rope is passed thru the pulley block attached to the top end of the gin pole & other end from the pulley block affixed to the bottom of stub. The free end at bottom of stub is tied to the winch for pulling & the other end is left free for clamping to the members to be lifted.

First, the leg members of the second section are hoisted and assembled. The temporary rope guys are shifted to the legs of the second section when they are being raised for erection. The legs of the second section / storey are kept in position by fixing the temporary rope guys. The bracings of the second section are then hoisted and assembled.

The derrick is then shifted to the corner leg member on the top of the second section to raise the parts of third section of the tower in position for assembly. Derrick(s) / Gin pole(s) and the temporary rope guys for the leg members are thus moved up as the tower is built up. This process is continued till the complete tower is erected.

Cross - arms are assembled on the ground. The bird guards and hangers for suspension towers are fitted on the cross - arms. A rope is passed through a pulley fixed on the tower peak. The cross - arms are raised up with this rope and fixed to the main body of the tower.

For heavier towers, a small boom is rigged on one of the tower legs for hoisting purposes, the members / sections can be hoisted either manually or by pulling with a winch machine operated from the ground

2) SECTION METHOD

The major sections of the tower are assembled on the ground and the same are erected as units. The derrick / gin pole used is approximately 10m long and is held in place by means of guys on the side of the tower to be erected.

The two opposite sides of the tower section of the tower are assembled on the ground. Each assembled side is then lifted clear of the ground with the derrick / gin pole and is lowered into position on bolts to stubs or anchor bolts. One side is held in place with props or rope guys while the other side is being erected. The two opposite sides are then laced together with cross members and bracings / diagonals, and the assembled section is lined up and made square to the line.

After completing the first section, the derrick / gin pole is set on the top of the first section. The derrick / gin pole is made to rest on a strut of the tower immediately below the leg joint. The derrick / gin pole has then to be properly guyed into position.

The first face of the second section is raised. To raise the second face of this section, it is necessary to shift the foot of the derrick / gin pole on the strut of the opposite side of the tower. After the two opposite

faces are raised, the bracings on the other two sides are fitted and bolted up. The last lift raises the top of the towers. After the tower top is placed and all side bracings have been bolted up, all the guy are removed except the one which is to be used to lower the derrick / gin pole.

Sometimes, one whole face of the tower is assembled on the ground, hoisted and supported in position. The opposite face is similarly assembled and hoisted and then the bracing angles connecting these two faces are fitted.

The cross - arms are assembled and erected in the manner given above.

TIGHTENING AND PUNCHING OF BOLTS AND NUTS:

Once the entire tower is installed, the next would be to set out a team for the tightening of all the bolts and also, to ensure that all the members are in place.

All empty holes are to be filled in with nut and bolt of appropriate size and a spring washer.

All nuts shall be tightened properly using correct size spanners.

Before tightening it should be seen that filler washers and plates are placed in relevant gaps between members, bolts of proper size and length are inserted, and one spring washer has been inserted under each nut. In case of step bolts, spring washer shall be placed under the outer nut.

The tightening shall progressively be carried on from the top downwards, care being taken that all bolts at every level are tightened simultaneously.

It may be better to employ four persons, each covering one leg and the face to his left.

The threads of bolts projecting outside nuts shall be punched at three positions on the diameter to ensure that the nuts are not loosened in course of time & on the treads of the bolts deep enough not to give room of loosening under any circumstances.

Suitable punches to create three impressions must be used. This will be implemented till the bottom belt level.

If during tightening a nut is found to be slipping or running over the bolt threads, the bolt together with the nuts shall be changed outright.

FINAL INSPECTION

Even after the full completion of the erection of tower, implement a process of checking the same, section wise before the tacking welding works to ensure that the tower is in perfect condition for taking the loads during the stringing operations.

APPENDIX 3B- STANDARD OPERATING (WORK) PROCEDURE STRINGING

PURPOSE:

This document describes the step wise work procedure to carry out the stringing work of 132 / 220 / 400 / 765 kV D/C, 800 kV HVDC or other kind of Transmission Line work in planned and controlled manner with reference to the drawings, technical specification and standards.

SCOPE:

This includes Tower Erection for all Types of Towers substructure works as indicated on Technical Specification / Drawing. The work shall be carried out in accordance with the specification and corresponding approved drawings.

EQUIPMENT:

- Tensioner & Puller
- Rollers
- Traveler
- Reel Stand
- Pilot Line Winder
- Swivel
- Running Board
- Theodolite
- Crimper
- Discharge rods
- And any other equipment / accessories required for safe handling & work purpose

PROCEDURE:

INSULATOR HOISTING:

- Ensure complete and apposite assembly of insulator with accessories as per the approved drawing on the ground before lifting.
- Ensure that the assembly is done on clean and dry surface
- Ensure that no damaged insulator is taken for assembly.
- Ensure insulator handling as per recommended by the OEM (Original Equipment Manufacturer)
- Clean each insulator before hoisting, in such a manner that it will not scratch damage or spoil the surface of the insulator, but in no case, oil should be used for cleaning.
- The corona rings shall be fully installed on their respective hardware before such hardware or insulator assembly is installed on the structure as per requirement.
- The insulator assembly shall be attached to the structure as indicated on the applicable drawing.
- Once it reaches its position it should be firmly fitted as per drawing.
- An insulator consisting of multiple insulator units, which shall be supported and protected during installation to prevent damage.

PRE-REQUISITE ACTIVITIES

Site Selection –

- Sites are to be selected keeping in view the accessibility of site for pullers, tensioners etc.
- Choose equipment location such that the sub structures shall not be overloaded.

- Drum length for conductor/OPGW/Earth wire should be considered before selection of the stringing section.
- Splicing position is to be considered depending up on the drum length, position of tower & tower access.
- A detailed patrolling of the site is to be done to know the condition of soil especially during rainy season.
- Clear all the area from obstacles.

Government Clearance–

- Ensure that a proper application is given to the section in-charge of electricity distribution division to obtain
- A shutdown where stringing work encounters live lines.
- After obtaining this, it should be sent to the corresponding substation for obtaining the shutdown.

Route Clearing–

- Trees and tall scrubs shall be cleared on either side of the center line of the route as per ROW clearance based on the voltage level.
- In addition, tall trees outside the area, of such height that they could fall within three meters of conductors shall be cut down after obtaining necessary permission. Before commencement of any tree cutting operation proper approval from authorized department has to be taken.

Resources Accumulation–

- Ensure that every tool and tackle that is required to carry out the work is available and in good working condition.
- Ensure the equipment (puller, tensioner etc.) are in good condition and with a valid test certificate.
- Ensure skilled manpower is available.
- Ensuring the proper drum schedule so that unnecessary mobilization of conductor drums / earth wire drums may be avoided to minimize the damage risk factor.
- Ensure availability of stringing material (conductor, crimper, traveler etc.)

Reinforcement of End Support–

- Double stays are provided on all cross arms and single stay is provided on the peak(s) of the angle / section towers.
- Anchor spikes/blocks have to be positioned adequately away from tower base, so that it is not exceeding 45° with horizontal (ground) as far as the topography permits the same.
- Earth anchors of sufficient capacity to be used for providing back stay for the towers.
- Steel stay wires are fixed on the cross arms / peaks using D – shackles and pulled up to the stay pit. They are connected to the stay lead from the pit through a turnbuckle using bulldog clamps.
- The turnbuckle is then tightened to a tension sufficient to balance the load which will be imposed on the cross arms / peak(s) when stringing is carried out on the other side of the tower.

INSTALLATION OF TRAVELER/ROLLER/RUNNING BLOCKS

- Install rollers (single/triple sheave) directly to the insulator in case of suspension tower for single conductor.

- Rollers are to be connected directly to yoke plate for V Strings.
- For bundle conductors travelers must be installed to the end of the insulator (suspension).
- For angle towers travelers are to be installed with a string attached to the cross arm. If substantial line angles are involved, two rollers in tandem may be required to reduce the bending radius of the conductor or the load on each traveler, or both. The running blocks shall be suspended in a manner to suit the design of the cross-arm.
- All running blocks especially those eat the tensioning and, will be fitted on the cross-arms with jute cloth wrapped over the steel work and under the slings to avoid damage to the slings as well as to the protective surface finish of the steel work. The rollers/travelers shall be having a groove to accommodate a semicircular section of conductor and larger than the diameter of the conductor/earth wire with enough space for free movement of the conductor wire inside it, so that it does not slip over or rub against the sides.
- The rollers/traveler's groove shall be lined with hard rubber or neoprene to avoid damage to conductor and shall be mounted on properly lubricated bearings.

STRINGING OF CONDUCTOR

Usually there are 2 methods used for stringing the conductors and ground wires as stated below.

a) Slack or Layout Stringing (Installation by Pulling Lines).

b) Tension Stringing.

Slack or Layout Stringing (Installation by Pulling Lines)–

In this method, the conductor reel is carried along the line on a vehicle and the conductor is deposited on the ground. The conductor reels are positioned on reel stands mounted on a transporting vehicle at the start of stringing section.

The conductor is unreeled from the shipping reel & dragged along the ground by means of a vehicle or pulling device. Braking device is normally provided to prevent overrunning and backlash. When the conductor reel is carried past a supporting structure, pulling is stopped and the conductor is placed in the travelers attached to the structure before proceeding to the next structure.

The conductor is then reattached to the pulling equipment and pull is continued till the next structure. This method is generally not recommended due to the damage to the conductor surface from dragging over ground, though it can be used where pulling equipment (tensioner, puller etc.) can't be moved on the site with permission from the customer.

Tension Stringing–

This method is generally used preferred for all type of transmission line stringing work. Using this method, the conductor is kept off the ground thus minimizing the damage caused by friction. The following steps are to be considered for this type of stringing.

Equipment/Material Transportation & Storage:

- The material along with the equipment (like conductor drums, conductor bits, pullet, tensioner, pulling ropes, pilot wire etc.) shall be transported & stored with care.
- Planning to be done in advance so that the material & equipment are available at site before starting the work.

- For handling and installation of equipment the handling or user manual from manufacturer must be referred.
- Once the pull sections are identified the placement of the puller, tensioner, reel stand etc. can be done. The drum is placed at the selected site (with the space required for its location) so that the cable outlet is on the upper part and aligned with the planned laying direction.
- The drum must be located at a suitable distance from the tensioner to allow enough fleet angles for the conductor leaving the reel and entering the bull wheel of the tensioner, so that no damage or scuffing of the conductor can occur.
- The lifting components usually used are hydraulic jacks and a bar with the suitable dimensions inserted in the central opening of the drum. The drum must be located at a sufficient height from the ground for free rolling movement. Level of the surface should be such that while rolling movement of the drum due to conductor pull is done it should not be unbalanced. Care shall be taken to insure that the conductors from the reels carry no dirt. Reels shall be properly cleaned before starting stringing operations for any line section. Before placing the drum reconfirm the length.
- Either the puller & the tensioner must be placed at a minimum distance from the tower equal to or more than twice the tower's height at respective positions. The tensioner as well as the puller should be placed aligned with the conductors. Tensioner machine will be anchored using spikes driven in the ground to counter the pull force. Care will be taken to ensure the Tensioner is positioned on almost level ground level and also at minimum off-set from center line as far as possible.
- Care has to be taken to minimize the angle of pull line with a maximum limitation of thirty degree from center line axis of stringing section.
- All the tools & tackles i.e. Pulleys, Anti-Twisting devices, swivel, pulling grip, clamps & suitable pulling ropes used must be placed near to the working area.
- Temporary electrical grounds shall be placed at both ends of the section and at intervals along the line, which is under construction. The grounding sets installed at both ends of the section shall remain in place until the completion of the work and shall be removed as the last phase of the clean-up. Hot stick shall be used for installing and removing the grounding sets.
- All temporary grounds installed for protection shall be clearly visible for inspection and shall be flagged by use of a red cloth placed at the point of grounding.
- All pulling and tensioning equipment shall be bonded and effectively grounded with approved type driven grounds securely attached to the equipment. At least two driven grounds shall be used at both the pulling and tensioning setup. All conductive parts of the tensioning setup and equipment shall be operated from grounded or insulated platform.
- All existing lines, which are de-energized for crossing, shall be short circuited and grounded at each side of the crossing. Use of discharge rod is necessary at both the ends of a line crossing.
- All grounds, except those placed at both ends of the section, and red flags shall be removed when they are no longer needed for protection. Guy wire or temporary guy wire shall not be used for grounding.

- The pulley block on each tower must be earthed and grounding roller to be used on drum side to ensure grounding of any induction current developed during installation.
- Communication will be established between winch and tensioner area and at designated points along pulling section by walkie-talkies. It is recommended to provide Green / Red flag in each & every tower of the stringing section.
- For stringing of bundled conductors with running board, it will be desirable to observe the running board as it passes through each traveler so in case of any blockage the observer can communicate to the puller & tensioner end. A back up communication system must be available during actual stringing, in case if one of it fails during the work.

Paving Out of Conductor

A pilot wire is first paved out by passing through the rollers / travelers fixed on the cross arms. The Supervisor will confirm if all pilot wires are positioned in the rollers and that the connector is properly secured. Pilot wires are pulled in under tension. The pilot wire is connected to a single conductor through swivel link, or to bundle conductors through swivel links thru woven grip and a running board, sometimes pilot lines are used to pull a heavier pulling line which in turn is used to pull the conductors.

The conductors shall be run out of the drums from the top in order to avoid any damage due to chafing. On confirmation of above, pulling will be started, slowly but steadily by synchronizing the operation of Puller and Tensioner, through radio communication. Conductor and earth wire will be kept off the ground and other obstructions by controlled tension at any time of the operation.

The spinning of the conductors and ground wires shall be prevented during stringing. The conductor shall be continuously observed for loose or broken strands or any other damage. The maximum tension imposed on a conductor during stringing operations shall not exceed than that necessary to clear obstructions on the ground.

In general stringing tension of about one-half of sagging tension is a good criterion. The sequence of running out shall be from top to downwards, that is, the earth wire shall be run out first, followed by the conductors in succession. Unbalances of loads on towers shall be avoided as far as possible.

Outer phases of line conductor-shall be strung before the stringing of the middle phase is taken up. Adequate steps shall be taken to prevent clashing of sub-conductors from paving out to the installations of the spacers/spacer dampers.

Care shall be taken that both sub-conductors of a bundle are from the same conductor supplier and-preferably from the same batch. When approaching end of a drum length at least three coils shall be left then the stringing operations are to be stopped. These coils are to be removed carefully, and, if another length is required to be run out, a joint shall be made as per the recommendations of the conductor manufacturers. It is recommended that the pulling to be continued until the conductor end is approximately 5 meters through winch tower, in order to facilitate sagging and tying in with tower cross arm.

It is recommended that the speeds of 3 – 4 km / hour should be maintained so as to provide a smooth passage of the running board or connecting hardware, or both, over the travelers. Slower speeds may cause significant swinging of the traveler and insulator hardware assemblies. Higher speeds may create a potential hazard of greater damage in case of a malfunction.

Hold-down blocks or similar devices will be used to uplift locations. Full tension joints shall be pressed during paying our and covered with joint protectors which will be removed at the end of the pull before sagging.

Splicing/Joints

All the joints on the conductor and earth wire shall be of compression type, in accordance with the recommendations of the manufacturer for which all necessary tools and equipment like compressors dies process, etc., shall have to be arranged in advance.

Each part of the joint shall be cleaned by wire brush to make it free of rust or dirt, etc. and properly greased with anticorrosive compound before the final compression is done with the compressors. All joints or splices shall be made at least 30 meters away from the structures.

No joints or splices shall be made in spans crossing over main roads, railways, small rivers in tension spans. Not more than one joint per sub-conductor shall be allowed in one span. The compression type fitting used shall be of self-centering type or care shall be taken to mark the conductors to indicate when the fitting is centered properly.

During compression or splicing operation, the conductor shall be handled in such a manner as to prevent lateral or vertical bearing against the dies. After pressing the joint the aluminium sleeve shall have all corners rounded, burrs and sharp edges removed and smoothened.

Considerations on Crossings

Scaffoldings are to be used wherever there is road crossing, line crossing, railway lines etc. are to be crossed during the stringing operations. It is to be ensured that the other work (viz. road traffic flow, etc.) isn't affected due to stringing of the tower.

It is to be ensured that the scaffolding provided for the crossing is of adequate strength so as to bear the loads of stringing operation.

Ensure that the shutdown permission is obtained from the concerned authority in case of electric line crossing. The shutdown procedure as stated below shall be followed.

- Ensure that the DB is switched off with a person present at DB all time possessing communication equipment (two-way radios/mobile).
- Ensure that for each line conductor there are 2 discharge rods available for shutdown.
- Electrical rubber hand gloves with rod for discharging cable fitting should be present at the site/location.
- First grounding/earthing of the mild steel (MS) rod should be done as shown overleaf. Then the cable to be earthed to the earthing rod. Then one by one discharge cables to be tightened to the electrical lines/phases with the help of discharge rods.

All the shutdown procedure form/ Permit to work form should be submitted by the supervisor/Engineer.

Sagging

Sagging processes consist of sag matching with the sag details mentioned in sag chart. The following considerations are to be made before sagging.

- Regulating spans or sag sighting spans identified.

- Sag Section.

Sagging is generally carried out by Sagging winch and a 4 way + 4-way pulley arrangement.

One steel wire rope lead is passed through an equalizing pulley, of diameter equal to the sub-conductor spacing, and its ends are connected to both the come along clamps on the conductors. This is done so that the tension on both the conductors remains the same. The equalizing pulley is connected to one end of the pulley system. The other end of the pulley system is connected to the dynamometer. The double tension hardware is hoisted and anchored on the cross arm. The dynamometer is connected to the yoke plate of the double tension hardware.

The running blocks, when suspended from the transmission structure for sagging shall be so adjusted that the conductors on running blocks will be at the same height as the suspension clamp to which it is to be secured.

Two leads and two pulley systems, one for each conductor, can be used in place of equalizing pulley. Both the pulley systems are connected to the yoke plate of the double tension hardware and tensioned together one by one as shown in following figures. However, dynamometer is used only on one conductor and the sag on the other conductor is matched with the sag of the first conductor.

A come along clamp is fitted on each rough sagged conductor at a distance from the tower on which the final sagging is being carried out. The come along clamp is then connected to the pulley arrangement which is being used for final sagging through a steel wire rope which is generally referred to as “lead”.

The length of this lead is such that, after final sag, the come along clamp remains far enough from the tower so that the loose portion of the conductor on the tower side can be pulled up to the cross arm for the purpose of measurement.

Now the tensioning is done in the wires so as to provide final sag, which is measured to complete the sagging of conductor/earth wire/OPGW. The conductors shall be pulled up to the desired sag and left in running blocks for at least one hour after which the sag shall be rechecked and adjusted. If necessary, before transferring the conductors from the running blocks to be suspension clamps.

The conductors shall be clamped within 56 hours of sagging in. The sag will be checked in the first and the last span of the section in case of sections up to eight spans and in one intermediate span also for sections with more than eight spans. The sag shall also be checked when the conductors have been drawn up and transferred from running blocks to the insulator clamps.

Clipping In

Clipping of the conductors in position shall be done in accordance with the recommendations of the manufacturer. Conductor shall be fitted with armour rods where it is made to pass through suspension clamps.

The jumpers at the section and angle towers shall be formed to parabolic shape to ensure maximum clearance requirements. Pilot suspension insulator string shall be used, if found necessary, to restrict the jumper swings to the design values. The security clip shall be properly opened and sprung into position.

Fittings/Accessories Installation

Spacers, spacer dampers, vibration dampers and other conductor and earth wire accessories shall be installed as per the design requirements and respective manufacturer's instructions. Spacers shall be fitted within 24 hours of the conductor clamping.

While installing the conductor and earth wire accessories proper care shall be taken to ensure that the surfaces are clean and smooth and no damage shall occur to any part of the accessories. Fasteners in all fittings and accessories shall be secured in position using torque wrench. Spacing bicycle/ trolley may also be used for fixing conductor accessories.

Recommendations for Sagging of the OPGW Cables:

The specific recommendations for OPGW are as follows

At the time of sagging, the attachment fittings must also be installed to prevent damage to the OPGW cable. While holding of OPGW wire, exact size groove type clamp should be used for holding the rough sag load of the OPGW wire. Over sagging for OPGW wire should not be done, as per sag chart only load should be taken to avoid damage to the fibre inside & earth peak bend.

After completion of sagging and clipping, the surplus OPGW is to be laid temporary on the tower body in coil (Diameter of coil is approximately 1.0 - 1.5 m) and fixed on the tower. It is important that precautions must be taken to prevent any damage to OPGW.

While connecting the OPGW to down lead clamp bending radius should be maintained as mentioned above otherwise fibers inside OPGW may get damage. Sealing of both ends to be done properly of OPGW cable, if Splicing / jointing work is not under progress.

Ensure that the 15–20-meter extra cable should be kept at both ends in addition to the tower height. Surplus length of OPGW is necessary to lead down from the strain clamp on the top of tower to the joint box along with the arm and tower structures. The position of joint box is near the bottom cross-arm and excess OPGW shall be coiled in such a way that the OPGW remains above the bottom cross- arm of the tower.

After splicing, each joint is to be optically verified using OTDR in order to ensure that the attenuation values are within the required margins.

Post Installation Tests/Checks

The conductor & OPGW is required to be tested for continuity, attenuation values etc. tests as required by client after completion of final sagging.

Conductor

- Continuity test are carried as per the client's requirement for ensuring that there is proper continuity and there is no breakage in the conductor.

OPGW

- The OPGW is verified optically using OTDR in order to ensure that the attenuation values are within the required margin. Also, the values are matched with the values obtained before installation & after installation.

TRANSPORT, LOADING, UNLOADING AND STORAGE:

The drums should always be transported in vertical position with the cable ends fixed to prevent cable from slackening. All of the staves and safe guards should be maintained until the drums are situated for immediate installation.

After the transport, the drums should be inspected to verify that they have not been damaged and that none of the staves and / or safeguards is broken.

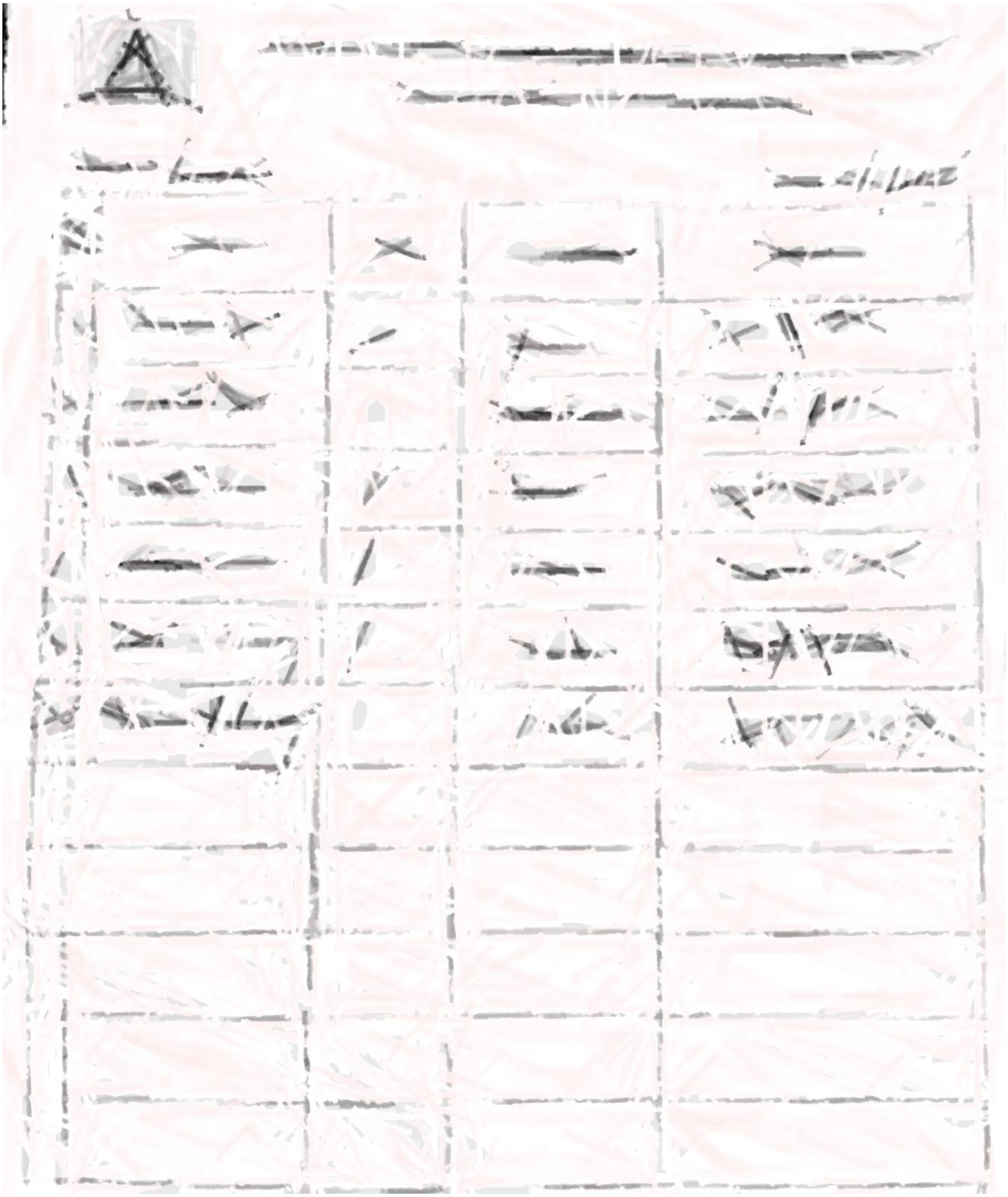
The drums should never, in any case, be thrown from the lorry during unloading, or moved by uncontrolled rolling. Loading and unloading are performed so that the drum remains in vertical position and the sides of the drum are not damaged by using suitable method.

The direction of the drum turns should follow the instruction of the mark on the drum. In any case the drum should not be stored horizontally. The ends of the cable should be sealed to prevent water penetration.

The drums can be moved by rolling a short distance ensuring that there are no objects that may damage the staves. The direction in which the drum turns should be the same as that in which the cable is wound during manufacture. If available the handling and storage should be done as per the recommendations of the OEM.

The drum should not be stored on its side under any circumstances whatsoever. The ends of the cable should be sealed to prevent water penetration. The drums should be stored on flooring that is strong enough to prevent sinking. The drums should be stored to facilitate handling and loading. They should be located far from any activity that may damage them.

APPENDIX 4A: SAMPLE ATTENDANCE SHEET OF PUBLIC CONSULTATION





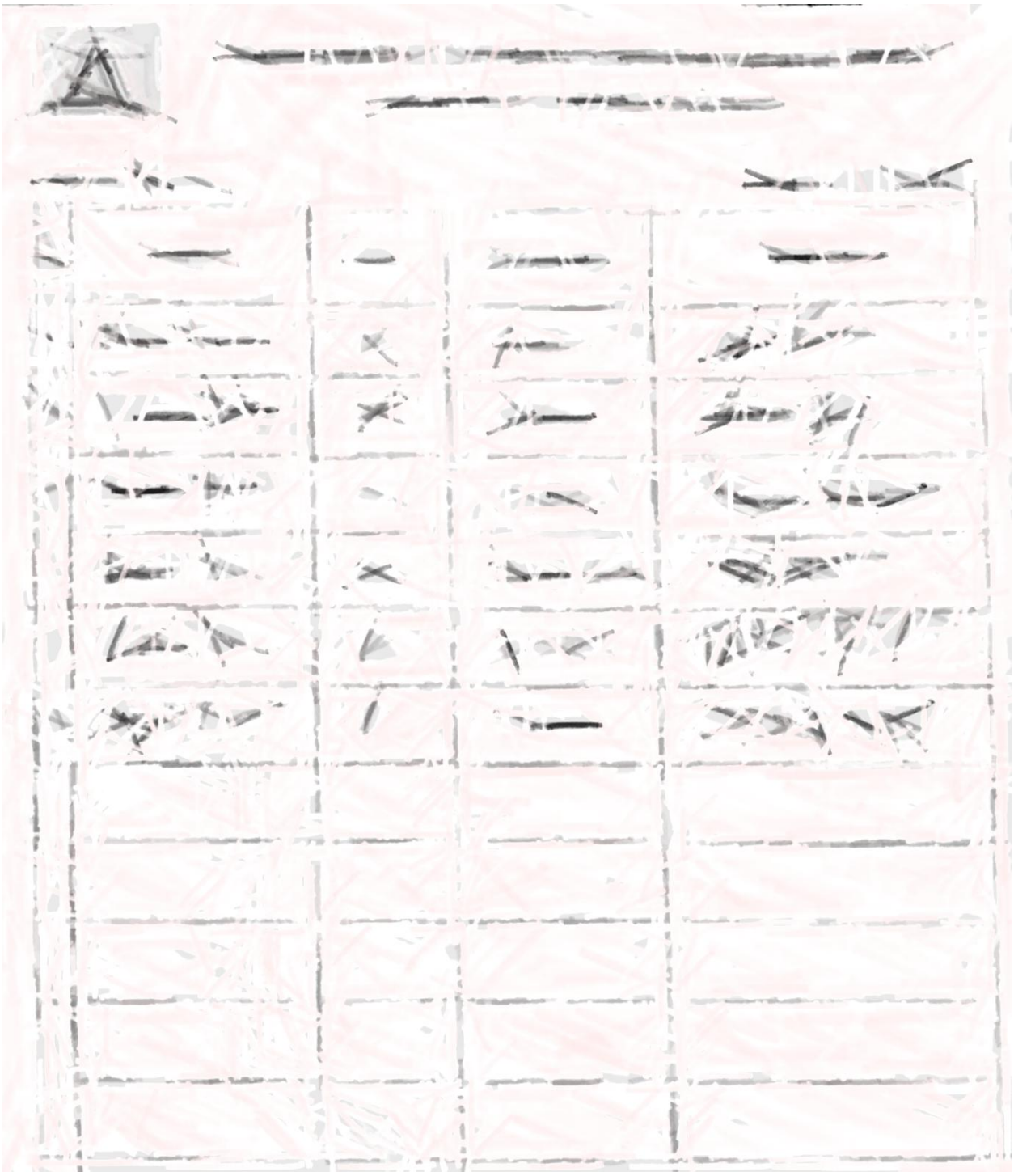
ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

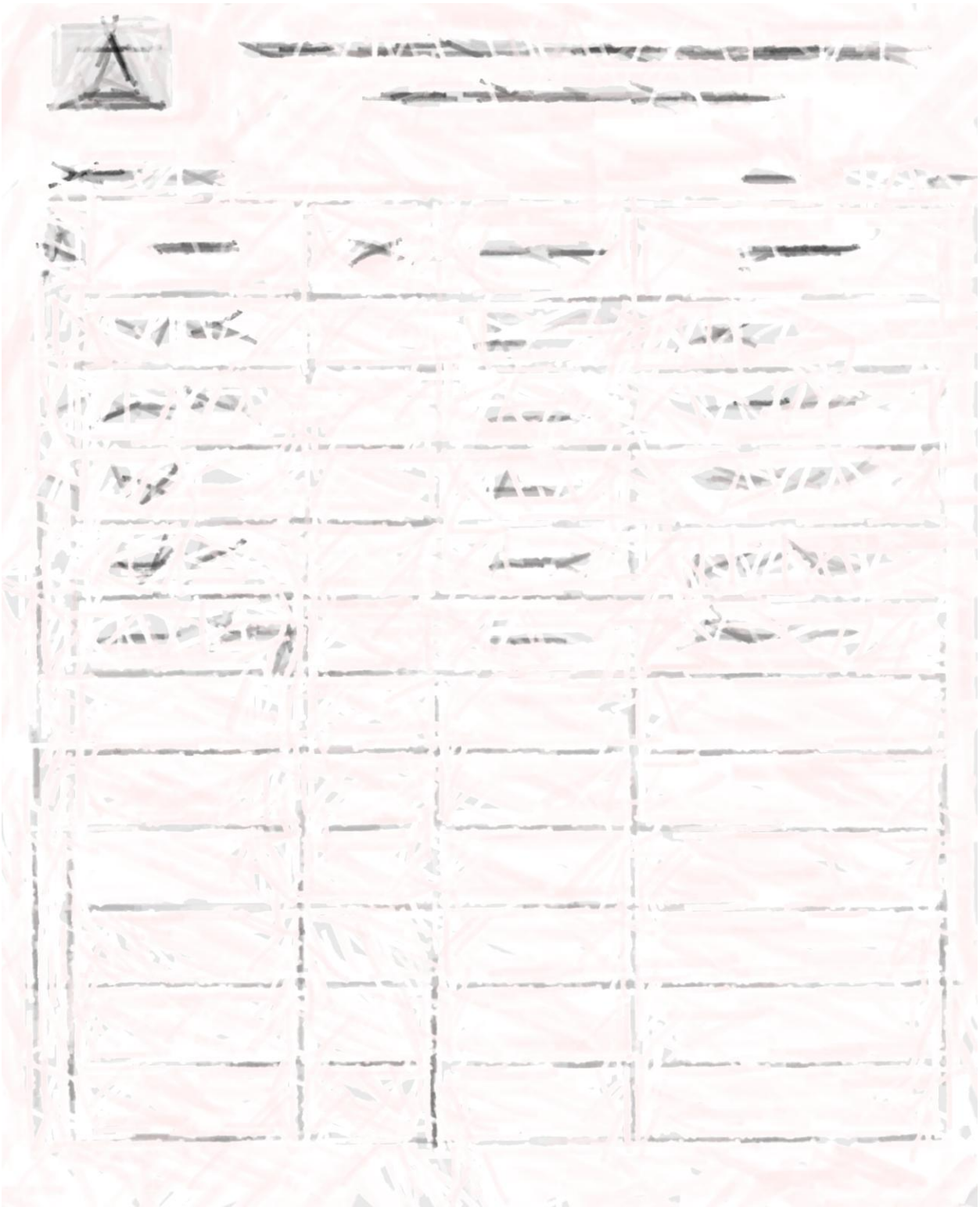
Attendance Sheet of Public Consultation

Venue: Dhanai Gaon

Date: 24/11/2025

SL. No.	Name	Sex	Occupation	Signature
1	Amit Tumu	M	Farmer	Amit Tumu
2	Dhanai Danka Rahang	M	Farmer	Danka Rhang
3	Baneswar Lalung	M	Farmer	[illegible]
4	Someswar Boro	M	Daily wage worker	[illegible]
5	Binita Deka	M	Daily wage worker	[illegible]





APPENDIX 4B: SOME PHOTOGRAPHS OF PUBLIC CONSULTATION



Photo Plate 1: Public consultation at Barni village.



Photo Plate 2: Public consultation at Dhemai Village.



Photo Plate 3: Public consultation at Moupur village.



Photo Plate 4: Public consultation at Nartap village.



Photo Plate 5: Public consultation at Bhakuagog village



Photo Plate 6: Public consultation at Lofar village.



Photo Plate 7: Public consultation at Bhokuagaog Village.



Photo Plate 8: Public consultation at Barkuchi village.



Photo Plate 9: Public consultation at Sonapur village



Photo Plate 10: Public consultation at Sonapur Pathar village



Photo Plate 11: Public consultation at Moupur village.



Photo Plate 12: Public consultation at Lurigaon village.

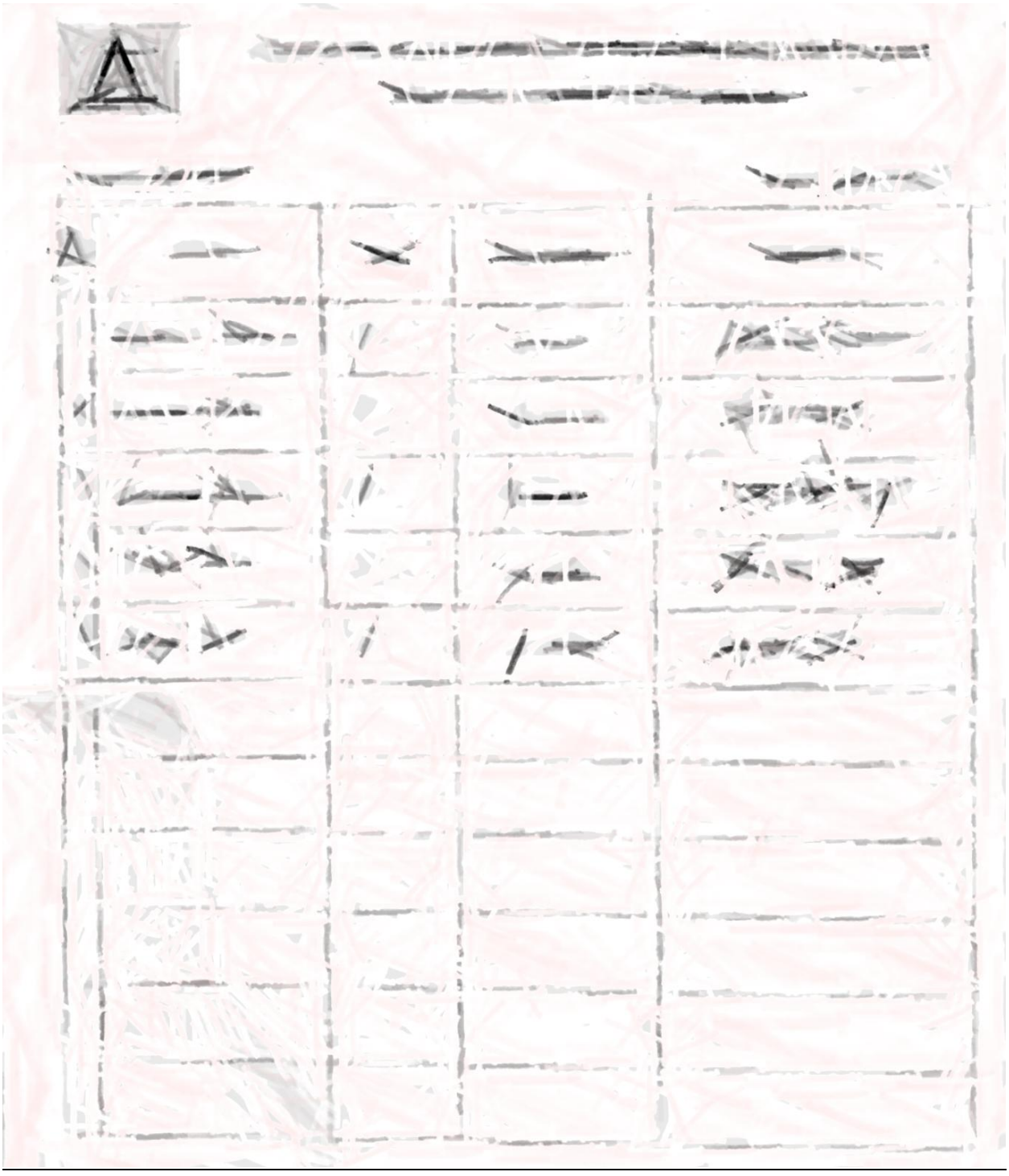


Photo Plate 13: Public consultation at Barni village.



Photo Plate 14: Public consultation at Sonapur Pathar village.

APPENDIX 4C: SAMPLE ATTENDANCE SHEET OF STACKHOLDER CONSULTATION



APPENDIX 5: IFC BENCHMARK STANDARDS FOR WORKERS ACCOMMODATION

PART II: STANDARDS FOR AND MANAGEMENT OF WORKERS' ACCOMMODATION

I. Standards for workers' accommodation

This section looks at the principles and standards applicable to the location and construction of workers' accommodation, including the transport systems provided, the general living facilities, rooms/dormitories facilities, sanitary facilities, canteen and cooking facilities, food safety, medical facilities and leisure/social facilities.

A. National/local standards

The key standards that need to be taken into consideration, as a baseline, are those contained in national/local regulations. Although it is quite unusual to find regulations specifically covering workers' accommodation, there may well be general construction standards which will be relevant. These may include the following standards:

- Building construction: for example, quality of material, construction methods, resistance to earthquakes.
- Housing and public housing: in some countries regulations for housing and public housing contain requirements on issues such as the basic amenities, and standards of repair.
- General health, safety and security: requirements on health and safety are often an important part of building standards and might include provisions on occupation density, minimal air volumes, ventilation, the quality of the flooring (slip-resistant) or security against intrusion.
- Fire safety: requirements on fire safety are common and are likely to apply to housing facilities of any type. This can include provision on fire extinguishers, fire alarms, number and size of staircases and emergency exits, restrictions on the use of certain building materials.
- Electricity, plumbing, water and sanitation: national design and construction standards often include very detailed provisions on electricity or plumbing fixtures/fittings, water and sanitation connection/ equipment.

Benchmark

1. The relevant national and local regulations have been identified and implemented.

B. General living facilities

Ensuring good standards in living facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of insects or rodents, as well as to maintain a good level of morale. The location of the facilities is important to prevent exposure to wind, fire, flood and other natural hazards. It is also important that workers' accommodation is unaffected by the environmental or operational impacts of the worksite (for example noise, emissions or dust) but is sufficiently close that workers do not have to spend undue amounts of time travelling from their accommodation to the worksite. Living facilities should be built using adequate materials and should always be kept in good repair, clean and free from rubbish and other refuse.

Benchmarks

1. Living facilities are located to avoid flooding and other natural hazards.
2. Where possible, living facilities are located within a reasonable distance from the worksite.
3. Transport from the living facilities to worksite is safe and free.
4. The living facilities are built with adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

Drainage

The presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others, and must be avoided.

Benchmarks

1. The building site is adequately drained to avoid the accumulation of stagnant water.

Heating, air conditioning, ventilation and light
Heating, air-conditioning and ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Benchmarks

1. For facilities located in cold weather zones, the temperature is kept at a level of around 20 degrees Celsius notwithstanding the need for adequate ventilation.

2. For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems are provided.

3. Both natural and artificial lighting are provided and maintained in living facilities. It is best practice that the window area represents not less than 5% to 10% of the floor area. Emergency lighting is provided.

Water
Special attention to water quality and quantity is absolutely essential. To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers should always have easy access to a source of clean water. An adequate supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet local or WHO drinking water standards[7] and water quality must be monitored regularly. Depending on the local context, it could either be produced by dedicated catchment and treatment facilities or tapped from existing municipal facilities if their capacity and quality are adequate.

Benchmarks

1. Access to an adequate and convenient supply of free potable water is always available to workers. Depending on climate, weather conditions and accommodation standards, 80 to 180 litres per person per day are available.

2. Drinking water meets national/local or WHO drinking water standards.[8]

3. All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

4. Drinking water quality is regularly monitored.

Wastewater and solid waste
Wastewater treatment and effluent discharge as well as solid waste treatment and disposal must comply with local or World Bank effluent discharge standards[9] and be adequately designed to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. Depending on the local context, treatment and disposal services can be either provided by dedicated or existing municipal facilities.

Benchmarks

1. Wastewater, sewage, food and any other waste materials are adequately discharged, in compliance with local or World Bank standards – whichever is more stringent – and without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.

2. Specific containers for rubbish collection are provided and emptied on a regular basis. Standards range from providing an adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents. In addition it is best practice to locate rubbish containers 30 metres from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odours associated with decaying organic materials.

3. Pest extermination, vector control and disinfection are carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis.

7. www.who.int/water_sanitation_health/dwq/en/
8. ibid

9. As per the "Pollution Prevention and Abatement Handbook", World Bank Group, July 1998, available from www.worldbank.org

C. Room/dormitory facilities

The standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene. Overcrowding should be avoided particularly. This also has an impact on workers' productivity and reduces work-related accidents. It is generally acknowledged that rooms/dormitories should be kept clean and in a good condition. Exposure to noise and odour should be minimised. In addition, room/dormitory design and equipment should strive to offer workers a maximum of privacy. Resorting to dormitories should be minimised and single or double rooms are preferred. Dormitories and rooms must be single-sex.

Benchmarks

1. Rooms/dormitories are kept in good condition.

2. Rooms/dormitories are aired and cleaned at regular intervals.

3. Rooms/dormitories are built with easily cleanable flooring material.

4. Sanitary facilities are located within the same buildings and provided separately for men and women.

5. Density standards are expressed either in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).

6. A minimum ceiling height of 2.10 metres is provided.

7. In collective rooms, which are minimised, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.

8. All doors and windows should be lockable, and provided with mosquito screens where conditions warrant.

9. There should be mobile partitions or curtains to ensure privacy.

10. Every resident is provided with adequate furniture such as a table, a chair, a mirror and a bedside light.

11. Separate sleeping areas are provided for men and women, except in family accommodation.

Additional issue

Irrespective of whether workers are supposed to keep their facilities clean, it is the responsibility of the accommodation manager to ensure that rooms/dormitories and sanitary facilities are in good condition.

Bed arrangements and storage facilities

The provision of an adequate numbers of beds of an appropriate size is essential to provide workers with decent, safe and hygienic conditions to rest and sleep. Here again, particular attention should be paid to privacy. Consideration should be given to local customs so beds could be replaced by hammocks or sleeping mats for instance.

Benchmarks

1. A separate bed for each worker is provided. The practice of "hot-bedding" should be avoided.

2. There is a minimum space between beds of 1 metre.

3. Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimised. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from to 0.7 to 1.10 metres.

4. Triple deck bunks are prohibited.

5. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.

6. Bed linen is washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).

7. Facilities for the storage of personal belongings for workers are provided. Standards vary from providing an individual cupboard for each worker to providing 475-litre big lockers and 1 metre of shelf unit.

8. Separate storage for work boots and other personal protection equipment, as well as drying/airing areas may need to be provided depending on conditions.

D. Sanitary and toilet facilities

It is essential to allow workers to maintain a good standard of personal hygiene but also to prevent contamination and the spread of diseases which result from inadequate sanitary facilities. Sanitary and toilet facilities will always include all of the following: toilets, urinals, washbasins and showers. Sanitary and toilet facilities should be kept in a clean and fully working condition. Facilities should also be constructed of materials that are easily cleanable and ensure privacy. Sanitary and toilet facilities are never shared between male and female residents, except in family accommodation. Where necessary, specific additional sanitary facilities are provided for women.

Benchmarks

1. Sanitary and toilet facilities are constructed of materials that are easily cleanable.

2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.

3. Sanitary and toilet facilities are designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.

4. Sanitary and toilet facilities are not shared between men and women, except in family accommodation.

Toilet facilities

Toilet arrangements are essential to avoid any contamination and prevent the spread of infectious disease.

Benchmarks

1. An adequate number of toilets is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.

2. Toilet facilities are conveniently located and easily accessible. Standards range from 30 to 60 metres from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins and be conveniently located. Toilets and other sanitary facilities should be ("must be" in cold climates) in the same building as rooms and dormitories.

Showers/bathrooms and other sanitary facilities

Hand wash basins and showers should be provided in conjunction with rooms/dormitories. These facilities must be kept in good working condition and cleaned frequently. The flooring for shower facilities should be of hard washable materials, damp-proof and properly drained. Adequate space must be provided for hanging, drying and airing clothes. Suitable light, ventilation and soap should be provided. Lastly, hand washing, shower and other sanitary facilities should be located within a reasonable distance from other facilities and from sleeping facilities in particular.

Benchmarks

1. Shower/bathroom flooring is made of anti-slip hard washable materials.

2. An adequate number of handwash facilities is provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap and hygienic means of drying hands.

3. An adequate number of shower/bathroom facilities is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.

4. Showers/bathrooms are conveniently located.

5. Shower/bathroom facilities are provided with an adequate supply of cold and hot running water.

E. Canteen, cooking and laundry facilities

Good standards of hygiene in canteen/dining halls and cooking facilities are crucial. Adequate canteen, cooking and laundry facilities and equipments should also be provided. When caterers are contracted to manage kitchens and canteens, special attention should be paid to ensure that contractors take into account and implement the benchmarks below, and that adequate reporting and monitoring mechanisms are in place. When workers can individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition. In addition, canteen, kitchen, cooking and laundry floors, ceilings and walls should be made of easily cleanable materials.

Benchmarks

1. Canteen, cooking and laundry facilities are built in adequate and easy to clean materials.

2. Canteen, cooking and laundry facilities are kept in a clean and sanitary condition.

3. If workers can cook their own meals, kitchen space is provided separate from sleeping areas.

Laundry facilities

Providing facilities for workers to wash both work and non-work related clothes is essential for personal hygiene. The alternative is for the employer to provide a free laundry service.

Benchmarks

1. Adequate facilities for washing and drying clothes are provided. Standards range from providing sinks or tubs with hot and cold water, cleaning soap and drying lines to providing washing machines and dryers.

2. When work clothes are used in contact with dangerous substance (for example, application of pesticide), special laundry facilities (washing machines) should be provided.

Additional issue

When workers are provided with facilities allowing them to individually do their laundry or cooking, it should be the responsibility of each worker to keep the facilities in a clean and sanitary condition. Nonetheless, it is the responsibility of the accomodation manager to make sure the standards are respected and to provide an adequate cleaning, disinfection and pest/vector control service when necessary.

Additional issue

When the employer provides family accommodation, it is best practice to provide each family with a private kitchen or the necessary cooking equipment to allow the family to cook on their own.

Canteen and cooking facilities

Canteen and cooking facilities should provide sufficient space for preparing food and eating, as well as conform to hygiene and safety requirements.

Benchmarks

1. Canteens have a reasonable amount of space per worker. Standards range from 1 square metre to 1.5 square metres.

2. Canteens are adequately furnished. Standards range from providing tables, benches, individual drinking cups and plates to providing special drinking fountains.

3. Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation.

4. Kitchens are provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.

5. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.

6. All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.

7. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable and washable surface.

8. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.

9. Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

F. Standards for nutrition and food safety

When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has a very direct impact on workers' productivity and well-being. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.[10]

Benchmarks

1. The WHO 5 keys to safer food or an equivalent process is implemented (see Box 6 below).

2. Food provided to workers contains an appropriate level of nutritional value and takes into account religious/cultural backgrounds; different choices of food are served if workers have different cultural/ religious backgrounds.

3. Food is prepared by cooks. It is also best practice that meals are planned by a trained nutritionist.

Box 6 - Five keys to safer food

Keep clean	
Wash your hands before handling food and often during food preparation. Wash your hands after going to the toilet. Wash and sanitise all surfaces and equipment used for food preparation. Protect kitchen areas and food from insects, pests and other animals.	While most micro organisms do not cause disease, dangerous micro organisms are widely found in soil, water, animals and people. These micro organisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause food borne diseases.
Separate raw and cooked	
Separate raw meat, poultry and seafood from other foods. Use separate equipment and utensils such as knives and cutting boards for handling raw foods. Store food in containers to avoid contact between raw and prepared foods.	Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous micro organisms which may be transferred onto other foods during food preparation and storage.
Cook thoroughly	
Cook food thoroughly, especially meat, poultry, eggs and seafood. Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer. Reheat cooked food thoroughly.	Proper cooking kills almost all dangerous micro organisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry.
Keep food at safe temperatures	
Do not leave cooked food at room temperature for more than 2 hours. Refrigerate promptly all cooked and perishable food (preferably below 5°C). Keep cooked food piping hot (more than 60°C) prior to serving. Do not store food too long even in the refrigerator. Do not thaw frozen food at room temperature.	Micro organisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of micro organisms is slowed down or stopped. Some dangerous micro organisms still grow below 5°C.
Use safe water and raw materials	
Use safe water or treat it to make it safe. Select fresh and wholesome foods. Choose foods processed for safety, such as pasteurised milk. Wash fruits and vegetables, especially if eaten raw. Do not use food beyond its expiry date.	Raw materials, including water and ice, may be contaminated with dangerous micro organisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Take care in selection of raw materials and implement simple measures such as washing.

Source: World Health Organization, Food Safety
www.who.int/foodsafety/publications/consumer/en/5keys_en.pdf

10. C. Wanjek (2005). "Food at Work – Workplace solutions for malnutrition, obesity and chronic disease", International Labour Organization, Geneva.

G. Medical facilities

Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighbouring communities and the availability of transport. However, first aid must always be available on site.

First aid facilities
Providing adequate first aid training and facilities can save lives and prevent minor injuries becoming major ones.

Other medical facilities
Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.

Benchmarks

1. A number of first aid kits adequate to the number of residents are available.

2. First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.

3. An adequate number of staff/workers is trained to provide first aid.

4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery).

Box 7 - UK/HSE First Aid facilities

What should be in a first aid kit?

There is no standard list and it very much depends on the assessment of the needs in a particular workplace:

- a leaflet giving general guidance on first aid, for example HSE leaflet *Basic advice on first aid at work*
- individually wrapped sterile adhesive dressings (assorted sizes)
- two sterile eye pads
- four individually wrapped triangular bandages (preferably sterile)
- six safety pins
- six medium-sized (approximately 12 cm x 12 cm) individually wrapped sterile unmedicated wound dressings
- two large (approximately 18 cm x 18 cm) sterile individually wrapped unmedicated wound dressings
- one pair of disposable gloves.

What should be kept in the first aid room?

The room should contain essential first aid facilities and equipment. Typical examples of these are:

- a sink with hot and cold running water
- drinking water and disposable cups
- soap and paper towels
- a store for first aid materials
- foot-operated refuse containers, lined with disposable yellow clinical waste bags or a container for the safe disposal of clinical waste
- a couch with waterproof protection, clean pillows and blankets
- a chair
- a telephone or other communication equipment
- a record book for recording incidents where first aid has been given.

Source: UK Health and Safety Executive

H. Leisure, social and telecommunication facilities

Basic leisure and social facilities are important for workers to rest and also to socialise during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be considered, taking account of the local context and potential conflicts in certain situations.

Benchmarks

1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi-purpose halls to providing designated areas for radio, TV, cinema.

2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.

3. Workers are provided with dedicated places for religious observance if the context warrants.

4. Workers have access to public phones at affordable/public prices (that is, not inflated).

5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated.

Box 8 - Examples of social/leisure facilities

In Qatar there is a newly built 170-hectare complex which accommodates contractors and more than 35,000 workers for a project run by a major oil company. At the heart of this complex, the recreation area includes extensive sport facilities, a safety-training centre, an outdoor cinema and a park. The purpose of those facilities goes beyond providing adequate accommodation to the large numbers of contractors and workers on this project but is designed to provide the same level of services as a small town. The accommodation complex has a mayor, as well as a dedicated welfare team which is responsible for the workers' welfare, cultural festivals and also acts as the community's advocates.

II. Managing workers' accommodation

Once the living facilities have been constructed and are operational, effective ongoing management of living facilities is essential. This encompasses issues such as the physical maintenance of buildings, security and consultation with residents and neighbouring communities in order to ensure the implementation of the housing standards in the long term.

A. Management and staff

Worker camps and housing facilities should have a written management plan, including management policies or plans on health and safety, security, living conditions, workers' rights and representation, relationships with the communities and grievance processes. Part of those policies and plans can take the form of codes of conduct. The quality of the staff managing and maintaining the accommodation facilities will have a decisive impact on the level of standards which are implemented and the well-being of workers (for instance on the food safety or overall hygiene standards). It is therefore important to ensure that managers are competent and other workers are adequately skilled. The manager will be responsible for overseeing staff, for ensuring the implementation of the accommodation standards and for the implementation of the management plans. It is important the accommodation manager has the corresponding authority to do so.

If the facility is being managed by a contractor, as is often the case, the expected housing and management standards should be specified in the relevant contract, and mechanisms to ensure that those standards are implemented should be set up. As part of this process, the accommodation manager (or contractor) should have a duty to monitor the application of the accommodation standards and to report frequently on their implementation to the client.

Benchmarks

1. There are management plans and policies especially in the field of health and safety (with emergency responses), security, workers' rights, relationships with the communities.

2. An appointed person with the adequate background and experience is in charge of managing the workers' accommodation.

3. If contractors are being used, there are clear contractual management responsibilities and monitoring and reporting requirements.

4. Depending on the size of the accommodation, there is a sufficient number of staff in charge of cleaning, cooking and of general maintenance.

5. Such staff are recruited from the local communities.

6. Staff have received basic health and safety training.

7. Persons in charge of the kitchen are trained in nutrition and food-handling and adequately supervised.

B. Charging fees for accommodation and services

Charging fees for the accommodation or the services provided to workers such as food or transport should be avoided where workers do not have the choice to live or eat anywhere else, or if deemed unavoidable, should take into account the specific nature of workers' accommodation. Any charges should be transparent, discussed during recruitment and specified in workers' contracts. Any such charges should still leave workers with sufficient income and should never lead to a worker becoming indebted to an employer.

Benchmarks

1. When fees are charged, workers are provided with clear information and a detailed description of all payments made such as rent, deposit and other fees.

2. When company housing is considered to be part of workers' wages, it is best practice that workers are provided with an employment contract clearly specifying housing arrangements and regulations, in particular rules concerning payments and fees, facilities and services offered and rules of notice.

3. When fees are charged, the renting arrangements are fair and do not cost the worker more than a small proportion of income and never include a speculative profit.

4. Food and other services are free or are reasonably priced, never above the local market price.

5. The provision of accommodation or other services by employers as a payment for work is prohibited.

Additional issue

To avoid that fair renting arrangements turn into unfair ones, any deposit of advance should be set at a reasonable level and it is best practice that renting prices include a fixed fee covering the water needed and the use of the energy required to the functioning of the heating/cooling/ventilation/ cooking systems. However, in such cases it might be necessary to raise workers' awareness to ensure that workers will use the facilities responsibly, particularly in areas where water is scarce.

C. Health and safety on site

The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical well-being and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fire regulations are respected for instance) and that adequate health and safety plans and standards are designed and implemented.

Benchmarks

1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.

2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.

3. An adequate number of staff/workers is trained to provide first aid.

4. A specific fire safety plan is prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills.

5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk-related activities is provided to workers. It is best practice to develop a clear policy on this issue.

6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.

7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.

8. Emergency plans on health and fire safety are prepared. Depending on the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes).

D. Security of workers' accommodation

Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks. Policies regarding the use of force (force can only be used for preventive and defensive purposes in proportion to the nature and the extent of the threat) should also be carefully designed. To implement those plans, it may be necessary to contract security services or to recruit one or several staff whose main responsibility is to provide security to safeguard workers and property. Before making any security arrangements, it is necessary to assess the risks of such arrangements to those within and outside the workers' accommodation and to respect best international practices, including IFC PS4 and EBRD PR4 and applicable law.[11] Particular attention should be paid to the safety and security of women workers.

Benchmarks

1. A security plan including clear measures to protect workers against theft and attack is implemented.

2. A security plan including clear policies on the use of force has been carefully designed and is implemented.

3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders are recruited.

4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.

5. Security staff have received adequate training in dealing with domestic violence and the use of force.

6. Security staff have a good understanding about the importance of respecting workers' rights and the rights of the communities.

7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.

8. Security staff adopt an appropriate conduct towards workers and communities.

9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff.

11. See for instance the Voluntary Principles on Security and Human Rights, www.voluntaryprinciples.org/principles

E. Workers' rights, rules and regulations on workers' accommodation

Freedoms and human rights of workers should be recognised and respected within their living quarters just as within the working environment. House rules and regulations should be reasonable and non discriminatory. It is best practice that workers' representatives are consulted about those rules. House rules and regulations should not prevent workers from exercising their basic rights. In particular, workers' freedom of movement needs to be preserved if they are not to become effectively "trapped". To this end it is good practice to provide workers with 24/7 access to the accommodation and free transport services to and from the surrounding communities. Any restriction to this freedom of movement should be limited and duly justified. Penalties for breaking the rules should be proportional and implemented through a proper procedure allowing workers to defend themselves and to challenge the decision taken. The relationship between continuing employment and compliance with the rules of the workers' accommodation should be clear and particular attention should be paid to ensure that housing rules do not create indirect limitation of the right to freedom of association. Best practice might include a code of conduct relating to the accommodation to be signed together with the contract of employment.

Box 9 - Dole housing plantation regulation in Costa Rica

In every plantation there is an internal accommodation regulation that every worker is required to sign together with his/her employment contract. That document describes the behaviour which is expected from workers at all times and basic rules such as the prohibition of alcohol and the interdiction to make noise after a certain time at night. In case there is any problem concerning the application of those internal rules, a set of disciplinary procedures which have been designed with the workers' representatives can be enforced. Workers are absolutely free to enter or leave the site and do not have any restrictions in relation to accessing their living quarters. Families are not allowed in the living quarters unless they have been registered for a visit.

Benchmarks

1. Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement.

2. Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to and from local communities.

3. Withholding workers' ID papers is prohibited.

4. Freedom of association is expressly respected. Provisions restricting workers' rights on site should take into account the direct and indirect effect on workers' freedom of association. It is best practice to provide trade union representatives access to workers in the accommodation site.

5. Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.

6. Workers are made aware of their rights and obligations and are provided with a copy of the internal workers' accommodation rules, procedures and sanction mechanisms in a language or through a media which they understand.

7. Housing regulations, including those relating to allocation of housing, should be non-discriminatory. Any justifiable discriminatory rules – for example all-male dormitories – should be strictly limited to the rules which are necessary to ensure the smooth running of the worker camp and to maintain a good relationship with the surrounding communities.

8. Where possible, visitor access should be allowed.

9. Decisions should be made on whether to prohibit alcohol, tobacco and third party access or not from the camp and the relevant rules should be clearly communicated to all residents and workers.

10. A fair and non-discriminatory procedure exists to implement disciplinary procedures including the right of workers to defend themselves (see also next section).

APPENDIX 6A: CONTRACTOR'S MONTHLY PROGRESS REPORT TEMPLATE

Monthly Progress Report for EPC
Assam Intra State Transmission System Enhancement Project
AIIB funded under AEGCL.
Govt. of Assam
Name of Month and Year

1. Project Details:

Sl. No.	Package	EPC Agency	Substations
Sl. No.	**Package**	**EPC**	**Transmission Lines**

2. Status of land details of GSS:

Sl. No.	GSS	Type of Land	Area (Hectare)	Status	References

3. Status of ESIA-ESMP

Sl. No.	GSS	ESIA-ESMP	CESMP

4. Legal Compliances Checklist:

Sl. No.	Indicators	Sub-station/Transmission Line Name-
1	Labour License	
2	BOCW License	
3	Water quality Testing from NABL Lab as per Standards	
4	Air Quality Testing from NABL Lab as per Standards	
5	Noise level testing from NABL Lab as per Standards	
6	Soil testing from NABL Lab as per Standards	
7	Ground water consent from CGBB, Assam	
8	DG Consent from PCB, Assam	
9	EHS Plan approval	
10	Grievance Redressed Register	
11	Labour camp facilities at site with signage	
12	Drinking water facilities at site and labour camp with signage	
13	Sanitation Facilities at sites and labour camp with signage	
14	Hygiene Facilities (Hand washing with Soap) at sites & labour Camp	
15	Safety Signage at the site	
16	Covid behaviour change communication signage	
17	Signage at main entry gate	
18	Use of PPE by the labour	

Sl. No.	Indicators	Sub-station/Transmission Line Name-
19	First aid kit for preliminary prevention & treatment	
20	Lightening Arrestor	
21	Chemical soak pit associated with Transformer for hazardous waste Management	
22	Rainwater Harvesting	
23	Solid Waste Management	

5. Detailed status of CTO/CTE, PUC etc.

Name of the documents	Site Name-
ESIA-ESMP approval	
CESMP approval	
Labour Licence	
Workmen Compensation Policy	
Erection all Risk policy	
Tree Cutting permission	
Ground water Extraction	
Borrow earth permission (EC)	
Permission for bricks (EC)	
Permission for sand (EC)	
Permission for Stone / Boulder (EC)	
CTE – Crusher	
CTO – Crusher	
Challan – Borrow Earth	

6. Present Status of Transmission Line of Package-

Present Status of Joint verification of landowner identification for Transmission Line under Assam Intra State Transmission System Enhancement Project (AIIB)									
Sl.No.	Name of the proposed substation under AIIB project	Name of the proposed Associated Transmission lines under AIIB project	Name of the Circle & Division	Name of the Revenue Circle	Name of the Deputy Commissioner Office/District	Letter communicated to Circle Office for Joint verification of landowner identification with date	Reasons of delay for joint verification of landowner identification	Row Status	Remarks
1									
2									

7. Status of CPTD

Sr. No.	Line Name	Line Length As per LOA	Anticipated line length	Location as per LOA	Anticipated locations	Check Survey Approved	Total Locations As per	Location as per LSD	Locations Hold up Due to	GM	Actual Locations for CPTD	Clear Front Locations for	Document collected till	Document verified by C.O	Demand Note Submitted	Locations Payment till	Locations Payment	Document pending till	Locations pending for
1																			
2																			
Total for Pkg-																			

8. Accident Monitoring

Name of the Substation	No. of Injury	Description of the Injury	Treatment Given

9. Status of Grievance Received and their Redressal (Public)

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance /Complain	Timeline*	Remarks
1					
2					

10. Status of Grievance Received and their Redressal (Labour)

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance /Complain	Timeline*	Remarks
1					
2					

11. Training–

12. Conclusion

Appendix (Photograph & Checklist)

APPENDIX 6B: PMC MONTHLY PROGRESS REPORT TEMPLATE

1. INTRODUCTION

2. DETAILS OF SUB-PROJECT

Circle	
Divisions	
Location (names of areas with GPS Coordinates)	
Total Geographical area	
Components of the package (detail all components)	
Contract start date	
Contract completion date	
Other details specific to the package	

3. COMPREHENSIVE DETAILS OF SITE VISITS CARRIED OUT IN PACKAGE- XX

Sl. No.	Sub-projects	No. of visits till date	Date of visits carried out in the month of XX	Total no of visit in the month of XX	Remarks
1					
2					

4. OBJECTIVE

5. MAJOR OBSERVATIONS AND RECOMMENDATIONS

Sl. No.	Date of site visit	Details of Officials Name	OBSERVATIONS	RECOMMENDATIONS

6. COMMUNITY CONSULTATION

Date	Total No. of Participants	Total No. of Female Participants	Issues raised by the community	Suggestions and Recommendations provided
---	---	---	---	---

7. GRIEVANCE REDRESSAL MECHANISM

8. GRIEVANCE REDRESSAL COMMITTEE

Sl. No.	Name and details	Designation	Status in the GRC (Convener/ Member)	Contact Details
1				
2				

9. DETAILS OF PUBLIC GRIEVANCES

Details of Grievance	Grievance raised by and medium	Date of Grievance received	Date of Grievance resolved	Steps taken to resolve the grievance	Remarks
---	---	---	---	---	---

10. DETAILS OF LABOUR GRIEVANCES

Details of Grievance	Grievance raised by and medium	Date of Grievance received	Date of Grievance resolved	Steps taken to resolve the grievance	Remarks
---	---	---	---	---	---

11. TRAININGS

Appendix-

APPENDIX 6C: SEMI ANNUAL MONITORING REPORT TEMPLATE

SEMI ANNUAL ENVIRONMENTAL AND SOCIAL MONITORING REPORT

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

SUBMITTED TO

ASIAN INFRASTRUCTURE INVESTMENT BANK

SUBMITTED BY

ASSAM ELECTRICITY GRID CORPORATION LIMITED

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7.5 HIGHLIGHTED ACTIONS……
8.0 IMPLEMENTATION OF GRIEVANCE REDRESSAL MECHANISM AND COMPLAINTS RECEIVED……
9.0 CORRECTIVE ACTION PLAN……
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LIST OF ABBREVIATIONS

WEIGHTS AND MEASURES

EXECUTIVE SUMMARY

Following are the Key issue / gaps observed and suggested corrective action

Sl. No.	Key issue/ gaps observed	Suggested corrective action	Responsibility	Timeframe

1. INTRODUCTION

1.1 BRIEF PROJECT DESCRIPTION

Assam Intra-State Transmission System Enhancement Project

Figure –: Location map of Project

1.1.1 Details of Substations and Transmission Lines

Table –1: Details of Packages (Substations and Transmission Lines)

Package	Name of EPC Contractor	Scope of Work		Contract Award	Contract Effective Date	Location / Village / Town / Tehsil / District	Consignee / Concerned Division Official	Area as per Appendix-11 of ESMPF (in Hectare)	Area at present (In Hectare)	Slope/ Plain	Type of Land	Ownership
		S/S Details	Transmission line details in (km)									

1.1.2 Details of Transmission Lines

Table 2: Details of Transmission Lines

Line length (in km) as per ESMPF	Line length (in km) as per Survey Report	No. of Towers	Right of Way (ROW in mts)	No. of Affected Villages	Names of the Affected Village

1.2 PROJECT PROGRESS STATUS AND IMPLEMENTATION SCHEDULE

Table 3: Physical and Financial Progress Status of Project during the reporting period

Sl. No.	Pkg No.	Effective/ Schedule Completion date	Agency	Order Value (INR Cr.)	Sub Station/ Transmission Line Name	Overall Physical Progress till XX in %	Financial Progress till XX in %	Ongoing work status

1.3 BRIEF PROGRESS SATUS OF THE PROJECT

Table: Brief Progress status of the project

Project Component Stage	Progress Status {not yet started; on-going; completed}	Percent Completed	Remarks

2. COMPLIANCE WITH APPLICABLE REGULATIONS/STANDARDS

2.1 ESIA - ESMP documentation status of each package as per approved ESMPF

Table: ESIA - ESMP documentation status of each package as per approved ESMPF

Pkg. No	Location	Name of the EPC contractor	Status of ESIA-ESMP	Status of CESMP report package wise

Table: Status of E&S Semi Annual Monitoring Report

Sl. No.	Name of the report	Status of SAMR

2.2 Mobilisation of E&S resources at each level i.e. PMU, PMC, and contractors

Table: Mobilisation of E&S resources at each level i.e. PMU, PMC, and contractors

Sl. No.	Name	Designation	Qualifications	Experience	Contact Details	Email ID
E&S staff of Project Management Unit (PMU)						
E&S staffs of Project Management Consultant (PMC)						
E&S staff of Engineering Procurement and Construction Contractors (as per CESMP)						
Package Name						

2.3 Compliance with Applicable Regulations/Standards

Table: Compliance with Applicable Regulations/Standards

Sl. No.	Regulations / Standards	Compliance Requirements under the Regulation	Compliance Status {complied; not complied; Not Arises (N/A) at the current stage of the project}	Remarks {provide details to show how compliance was achieved; or explain the corrective action done if there was non-compliance}

3. COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL COVENANTS FROM THE AIIB LOAN AGREEMENT

Table: Compliance with Environmental and Social Covenants from the AIIB Loan Agreement

Schedule #, Para. #	Covenant	Compliance Status	Remarks

4. COMPLIANCE WITH THE CIVIL WORK CONTRACT AGREEMENT

Table: Compliance with the Civil Work Contract Agreement

Schedule #, Para. #	Relevant EHS Clauses	Compliance Status	Remarks

5. COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Following are the Key issue/ gaps observed and suggested corrective action

Table: Key issue/ gaps observed and suggested corrective action

Sl. No.	Key issue/ gaps observed	Suggested corrective action	Responsibility	Timeframe

Following are the key findings noted during the reporting period

Pkg	Location	Name of Contractor	Status of ESMP / CESMP implementation	Non-Compliance	Corrective Action Proposed	Photographs	Compliance against Corrective action Proposed

6. COMPLIANCE TO RESETTLEMENT ACTION PLAN AND TRIBAL PEOPLE'S PLAN (IF ANY)

Table: Compliance with Resettlement Action Plan and Tribal People's Plan

Sl. No.	Abbreviated Resettlement Action Plan (ARAP) and Tribal people's plan	Compliance Status {complied; not complied; n/a at current stage of the project}	Remarks {provide details to show how compliance was achieved; or explain the corrective action done if there was non-compliance}

7. SUMMARY OF MONITORING RESULTS

7.1 ENVIRONMENTAL AND SOCIAL MONITORING

Table: Package-wise Ambient Noise Level Monitoring Results

Name of Package	Name of Monitoring Station	Sound Parameters (dBA)				CPCB Ambient Noise Standards [Limit in dB (A) Leq]		Remarks
		Results (Baseline data) Limits in dB(A)		Limits in dB(A) / (Data generated for pre- monsoon season 2024)				
		Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	

7.2 Capacity Building Monitoring

Table: Details of Capacity building program

Sl. No.	Date	Topic of Training	Participant/ Organization	No. of Participant

7.3 Capacity Building on the safety inductions and meetings, including safety toolbox talks conducted during the reporting period

Table: Summary of the Capacity Building on the safety inductions and meeting including TBT

Sl. No.	Packages	Name of Substation	Numbers of Induction	Numbers of Toolbox Talk	Numbers of Training	Numbers of Mock Drill

7.4 Accident monitoring during the period of XXX

Table: Summary of the accident monitoring during the reporting period

Sl. No.	Packages	Name of Substation	Total numbers of accident occurred during XXX

7.5 Highlighted Actions

8. IMPLEENMTATION OF GRIEVANCE REDRESSAL MECHANISM AND COMPLAINTS RECEIVED

Table: Status of Grievance Received and their Redressal

Public Grievances

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance / Complain	Timeline*	Remarks	Sample Photographs

Labour Grievance

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance / Complain	Timeline*	Remarks	Sample Photographs

Summary table showing type and level of complaints (Labour Grievance)

Sl. No	Type of Grievance	Package wise grievance received	Total No	Level of Grievance

9. CORRECTIVE ACTION PLAN

Table: Key issues and Corrective Action Plan

Sl. No.	Key issues	Action Required	Responsibility	Target Date	Indicator of Compliance /Corrective actions plan

10. STATUS OF NON-COMPLIANCES FROM PREVIOUS MONITORING REPORT

Table –-Status of the non-compliances and corrective actions proposed in the previous (XX) monitoring report.

Sl. No.	Key issues	Action Required	Responsibility	Compliance status on corrective actions of previous (x) monitoring report during the present reporting period.	Present Status

11. CONCLUSION AND RECOMMENDATIONS

Conclusion
Recommendations

Appendix

ESIA-ESMP implementation monitoring for Sub-station component

A. Site visit details for Substation

Package	Location	No. of Site visit	Date of Site Visit	Remarks

B. Site visit details for Transmission lines

Package	Location	No. of Site visit	Date of Site Visit	Purpose

C. Photographs of the Site visit

APPENDIX 7: WILDLIFE MONITORING CHECKLIST – OPERATIONAL PHASE (400 kV TRANSMISSION LINE) TEMPLATE

1. Bird Electrocution & Collision
    - Regular inspection of towers and conductors for evidence of bird electrocution (scorch marks, carcasses).
    - Monitoring for bird flight paths, especially during migratory seasons.
    - Check effectiveness of bird diverters or flight diverters (visibility enhancers).
    - Inspection of nesting activity on towers or poles.
    - Maintain a log of species affected, location, and dates of incidents.
2. Elephant Movement and Corridor Interaction
    - Mapping and regular verification of elephant corridors intersected by the transmission line.
    - Observation and recording of elephant crossings near line towers and RoW.
    - Monitor tower stability in areas prone to elephant movement (elephant rubbing or pushing).
    - Ensure barrier-free movement through elevated sections or alternative passages.
    - Engagement with forest department and local communities for real-time elephant movement alerts.
3. Mammal and Reptile Interference
    - Regular patrols along the RoW to observe signs of mammal and reptile activity.
    - Report and document wildlife mortality incidents (due to electrocution, entanglement, etc.).
    - Inspect fence lines (if any) to ensure they do not restrict wildlife movement.
4. Vegetation and Habitat Monitoring
    - Periodic assessment of vegetation regrowth in RoW to avoid trimming that may disrupt habitats.
    - Monitor for spread of invasive species after RoW clearing.
    - Ensure that habitat restoration (if applicable) near towers is progressing as per plan.
5. Community and Stakeholder Feedback
    - Establish a mechanism for local communities to report wildlife sightings or incidents.
    - Coordinate with forest/wildlife officials to share monitoring reports and get inputs.
6. Emergency Response Readiness
    - Maintain a wildlife rescue and response contact list.
    - Have SOPs in place for wildlife accidents or electrocution events.
7. Documentation and Reporting
    - Maintain a Wildlife Monitoring Register with GPS-tagged records.
    - Prepare and submit periodic reports (monthly/quarterly) to relevant authorities.
    - Photographic evidence of wildlife sighting and incidents.

APPENDIX 8: ENVIRONMENTAL MONITORING TEST REPORT

400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line

ENVIRONMENTAL QUALITY MONITORING REPORT

Project Name:
CONSTRUCTION OF 400/220KV, 2X500 MVA GIS AT SONAPUR ALONG WITH THE ASSOCIATED TRANSMISSION LINES

Assam Electricity Grid Corporation Ltd

Date of Sampling 31/10/2025
& 01/11/2025

Contractor
Techno Electric & Engineering Co. Ltd.
Chandrarup, House No.2, Bishnupath
Ghuramara Charali, Guwahati
ASSAM-781028, India.

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(A unit of XEUJ ABHIJANTRIK LLP)
GUWAHATI, ASSAM-781028

AMBIENT AIR QUALITY MONITORING



Date of Sampling 31/10/2025 & 01/11/2025
N:26º07'54", E:91º59'53"

Project Name:
CONSTRUCTION OF 400/220KV, 2X500 MVA GIS AT SONAPUR ALONG WITH THE ASSOCIATED TRANSMISSION LINES

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(a unit of XEUJ ABHIJANTRIK LLP)
GUWAHATI, ASSAM-781028

গ্ৰীনটেক্ এনভাইৰনমেন্টল ইঞ্জিনিয়াৰ এণ্ড কন্সালটেন্টছ
GREENTECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(A Unit of XEUJ ABHIJANTRIK LLP)
House No-11, Champaknagar, Narayan Path, Bhetapara, Guwahati-781028, www.greentecheec.in
Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheec.in

TC-15242

Format No.: GEEC/FM/48

TEST REPORT

ULR Number: TC152422500001480F					
Test Report No.:	GEEC/FL/22/2025/10/22		Date:	05/11/2025	
Customer Name And Addrss:	Techno Electric & Engineering Co. Ltd. Chandrarup, House No.2, Bishnupath, Ghuramara Charali, Guwahati ASSAM-781028, India.		Lab. ID No.:	GEEC/AA/2025/10/22	
Sampling Location:	Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines N:26°07'54", E:91°59'53"		Date of Sampling:	31/10/2025-01/11/2025	
Ambient Temperature:	Max.	Min.	Humidity in %	Max	Min
	25.7°C	22.4°C		98.3	54.6
Wind Speed in Kmph:	Max	Min	Wind Direction	10 Hrs	20 Hrs
	7.2	0		W	ESE
Sampling Condition:	In GF/A, PTFE Filter Paper & Plastic Bottle		Date of Sample Receipt:	01/11/2025	
Monitored By:	Mr.Sanjib Rajkhowa		Test Start Date:	03/11/2025	
Equipments Details:	Fine Dust Sampler:ADS-03 RDS/01		Test End Date:	05/11/2025	

AMBIENT AIR QUALITY

Sampling and Analysis carried out as per GEEC/SOP/01

Sl. No.	Parameters	Unit	Results	Limits	Test Method
1	Particulate Matter (PM_{10})	$\mu g/m^3$	64	100	IS 5182(23)
2	Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	27	60	IS 5182(24)

Remark: .The parameters tested on the specific date are found to be within the NATIONAL AMBIENT AIR QUALITY STANDARDS, CPCB NOTIFICATION DATED 18TH NOVEMBER, 2009

Checked by:
Dr. Belinda Lahon
Quality Manager

Reviewed by:
Pranjal Buragohain
Authorised Signatory

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Page1 of 1

NOISE LEVEL MONITORING



Date of Sampling 31/10/2025 & 01/11/2025
N:26º07'54", E:91º59'53"

Project Name:
Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines.

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(a unit of XEUJ ABHIJANTRIK LLP)
GUWAHATI, ASSAM-781028

গ্রীনটেক্ এনভাইৰনমেন্টল ইঞ্জিনিয়াৰ এণ্ড কন্সালটেন্টছ
GREENTECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(A Unit of XEUJ ABHIJANTRIK LLP)
House No-11, Champaknagar, Narayan Path, Bhetapara, Guwahati-781028, www.greentecheec.in
Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheec.in

TC-15242

TEST REPORT

Format No:GEEC/FM/47A

ULR Number: TC152422500001481F			
Report No:GEEC/FL/22/NLM/2025/10/25		Date:	05/11/2025
Name of the Industry:	Techno Electric & Engineering Co.	Lab Id.:	GEEC/NLM/2025/10/25
Address:	Chandrarup, House No.2, Bishnupath Ghuramara Charali, Guwahati ASSAM-781028, India.		
Noise Level Report			
Monitoring Location:	Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines N:26°07'54", E:91°59'53"	Date of Monitoring:	31/10/2025 -01/11/2025
Weather/Wind:	Cloudy with Intermittent Rain	Sound Level Meter	SL-4033 SD
Monitored By:	Mr.Sanjib Rajkhowa	Sl.No.	Q699155

Measurement Results (Day Time)

Sl. No.	Parameters	Unit	Results	Method	CPCB Limit as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Leq (dBA)
1	Leq	dB(A)	60.8	Ambient Noise GEEC/SOP/AN/01 Issue date 27/05/2017	CPCB Limit for Commercial Area: Day Time Leq < 65 Night time Leq < 55
2	Lmin	dB(A)	56.8		
3	Lmax	dB(A)	62.4		

Remark: The parameters tested on the specific date are found to be within the CPCB Limit for Commrcial Area

Checked by
Dr. Belinda Lahon
Quality Manager

Reviewed by:
Pranjal Buragohain
Authorised Signatory

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Page 01/02

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TC-15242

TEST REPORT

Format No:GEEC/FM/47A

ULR Number: TC152422500001481F			
Report No:GEEC/FL/22/NLM/2025/10/25		Date:	05/11/2025
Name of the Industry:	Techno Electric & Engineering Co.	Lab Id.:	GEEC/NLM/2025/10/25
Address:	Chandrarup, House No.2, Bishnupath Ghuramara Charali, Guwahati ASSAM-781028, India.		
Noise Level Report			
Monitoring Location:	Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines N:26°07'54", E:91°59'53"	Date of Monitoring:	31/10/2025 -01/11/2025
Weather/Wind:	Cloudy with Intermittent Rain	Sound Level Meter	SL-4033 SD
Monitored By:	Mr.Sanjib Rajkhowa	Sl.No.	Q699155

Measurement Results (Night Time)

Sl. No.	Parameters	Unit	Results	Method	CPCB Limit as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Leq (dBA)
1	Leq	dB(A)	48.4	Ambient Noise GEEC/SOP/AN/01 Issue date 27/05/2017	CPCB Limit for Commercial Area: Day Time Leq < 65 Night time Leq < 55
2	Lmin	dB(A)	40.6		
3	Lmax	dB(A)	49.5		

Remark: The parameters tested on the specific date are found to be within the CPCB Limit for Commrcial Area

Checked by
Dr. Belinda Lahon
Quality Manager

Reviewed by:
Pranjal Buragohain
Authorised Signatory

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SOIL SAMPLING



Date of Sampling 31/10/2025
N:26º07'54", E:91º59'53"

Project Name:
Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines.

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
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Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheec.in
TC-15242

GEEC/FM/47/B

TEST REPORT

ULR Number: TC152422500001482F			
Ref. No.:	GEEC/FL/32/2025/10/03	Date of Reporting:	07/11/2025
Customer Name:	Techno Electric & Engineering Co. Ltd	Lab. ID No.:	GEEC/SOIL/2025/10/03
Customer Address:	Chandrarup, House No.2, Bishnupath, Ghuramara Charali, Guwahati ASSAM-781028, India.	Name of the project	Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines
Sampling Location:	GIS Premise N:26°07'54", E:91°59'53"	Date of Sampling:	31/10/2025
		Sample Reciept Date:	31/10/2025
Weather Condition at Site:	Cloudy with Intermittent Rain	Test Start Date:	01/11/2025
		Test Completion Date:	07/11/2025
Temperature at Site:	Max: 25.7°C Min: 22.4°C	Sample Description:	Soil Sample
Sampling Method:	GEEC/SOP/03	Sample Condition:	Marked & Sealed in plastic Ziplock
Sample Drawn By:	Mr.Dilip Kr. Deka	Test Performed At:	Laboratory

SOIL ANALYSIS REPORT

Sl. No.	TEST	UNITS	RESULTS	TEST METHOD
1	pH	---	6.44	IS 2720 Part 26
2	Electrical Conductivity	mS/cm	0.089	IS 14767
3	Moisture Content	%	26.4	IS 15106
4	Organic Matter	%	1.5	IS 2720 Part 22

Checked & Reviewed by:
Dr. Belinda Lahon
Quality Manager

Authorised by:
Pranjal Buragohain
Authorised Signatory

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GEEC/FM/47/B

TEST REPORT

Ref. No.:	GEEC/FL/32/2025/10/03	Date of Reporting:	07/11/2025
Customer Name:	Techno Electric & Engineering Co. Ltd	Lab. ID No.:	GEEC/SOIL/2025/10/03
Customer Address:	Chandrarup, House No.2, Bishnupath, Ghuramara Charali, Guwahati ASSAM-781028, India.	Name of the project	Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines
Sampling Location:	GIS Premise N:26°07'54", E:91°59'53"	Date of Sampling:	31/10/2025
		Sample Reciept Date:	31/10/2025
Weather Condition at Site:	Cloudy with Intermittent Rain	Test Start Date:	01/11/2025
		Test Completion Date:	07/11/2025
Temperature at Site:	Max: 25.7°C Min: 22.4°C	Sample Description:	Soil Sample
Sampling Method:	GEEC/SOP/03	Sample Condition:	Marked & Sealed in plastic
Sample Drawn By:	Mr.Dilip Kr. Deka	Test Performed At:	Laboratory

SOIL ANALYSIS REPORT

Sl. No.	TEST	UNITS	RESULTS	TEST METHOD
1	Sulphite as SO_3	mg/Kg	14.6	IS 14487: 1998
2	Chloride	mg/kg	12.8	GEEC/SOP/03
3	ORP	mV	465	GEEC/SOP/03

Checked & Reviewed by:
Dr. Belinda Lahon
Quality Manager

Authorised by:
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Page 1 of 1

WATER SAMPLING



Date of Sampling 31/10/2025
N:26°07′5″, E:91°59′55″

Project Name:
Construction of 400/220kV, 2x500 MVA GIS at Sonapur along with the associated Transmission Lines

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
(a unit of XEUJ ABHIJANTRIK LLP)
GUWAHATI, ASSAM-781028

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House No-11, Champaknagar, Narayan Path, Bhetapara, Guwahati-781028, www.greentecheec.in
Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheec.in
TC-15242

Format No.: GEEC/FM/50

TEST REPORT

ULR Number: TC152422500001483F			
Ref. No.: GEEC/FL/23/2025/10/20		Date of Reporting:	05/11/2025
Customer Name:	Techno Electric & Engineering Co. Ltd.	Lab. ID No.:	GEEC/WS/2025/10/20
Customer Address:	Techno Electric & Engineering Co. Ltd. Chandrarup, House No. 2, Bishnupath Ghuramara Charali	Date of Sampling:	31/10/2025
Sampling Location:	Borewell of Project Office	Sample Receipt Date:	31/10/2025
Sample Description:	Ground Water	Test Start Date:	31/10/2025
Sample Drawn By:	Mr. Dilip Deka	Test Completion Date:	04/11/2025
Sample Condition:	Sealed	Sampling Method:	GEEC/SOP/02

SL. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	pH	IS 3025 Part 11 2022	–	6.51	6.5 - 8.5	No relaxation
2	Conductivity	IS 3025 Part 14 1984 (RA:2019)	ms/cm	0.118	–	–
3	Colour	IS 3025 Part 4 1983 (RA:2021)	Hazen	1	5	15
4	Total Dissolved Solids	IS 3025 Part 16 : 2023	mg/l	59	500	2000
5	Total Suspended Solids	IS 3025 Part 17 : 2022	mg/l	< 10	–	–
6	Turbidity	IS 3025 Part 10 : 2023	NTU	1	1	5
7	BOD	IS 3025 Part 44 2023	mg/l	< 2	–	–
8	Dissolved Oxygen	IS 3025 Part 38 1989(RA 2019)	mg/l	3.1	–	–
9	Chlorides	IS 3025 Part 32 1988 (RA:2019)	mg/l	< 2	250	1000
10	Fluoride	APHA 24th EDITION, 2023	mg/l	< 0.5	1	1.5
11	Hardness	IS 3025 Part 21 2009 (RA:2019)	mg/l	34	200	600
12	Iron	IS 3025 Part 53 : 2024	mg/l	0.20	0.30	No relaxation
13	Oil & Grease	IS 3025 Part 39 2021	mg/l	< 2	–	–
14	Odour	IS 3025 Part 5 1983 (RA:2018)	–	Agreeable	Agreeable	Agreeable
13	Sulphates	IS 3025 Part 24 2022	mg/l	< 2	200	400

Checked & Reviewed by:
Dr. Belinda Lahon
Quality Manager

Authorised by:
Mr. Pranjal Buragohain
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Mobile: 9435046677, 9954089052, E-mail: green_pranjal@hotmail.com, info@greentecheec.in

Format No.: GEEC/FM/50

TEST REPORT

Ref. No.: GEEC/WS/2025/10/20		Date of Reporting:	05/11/2025
Customer Name:	Techno Electric & Engineering Co. Ltd.	Lab. ID No.:	GEEC/WS/2025/10/20
Customer Address:	Techno Electric & Engineering Co. Ltd. Chandrarup, House No. 2, Bishnupath Ghuramara	Date of Sampling:	31/10/2025
Sampling Location:	Borewell of Project Office	Sample Receipt Date:	31/10/2025
Sample Description:	Ground Water	Test Start Date:	31/10/2025
Sample Drawn By:	Mr. Dilip Deka	Test Completion Date:	04/11/2025
Sample Condition:	Sealed	Sampling Method:	GEEC/SOP/02

SL. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	Nitrate	IS 3025 Part 34 1988(RA:2019)	mg/l	< 5	45	No relaxation
2	E. Coli	HiMedia Kit	Present/ Absent	Absent	Absent	Absent
3	Total coliform	APHA 24th EDITION, 2023	Present/ Absent	Absent	Absent	Absent
4	Taste	APHA 24th EDITION, 2023	--	Agreeable	Agreeable	Agreeable
5	Floating Materials	APHA 24th EDITION, 2023	--	Not visible	---	---

Checked & Reviewed by:

Dr. Belinda Lahon
Quality Manager

Authorised by:

Mr. Pranjal Buragohain
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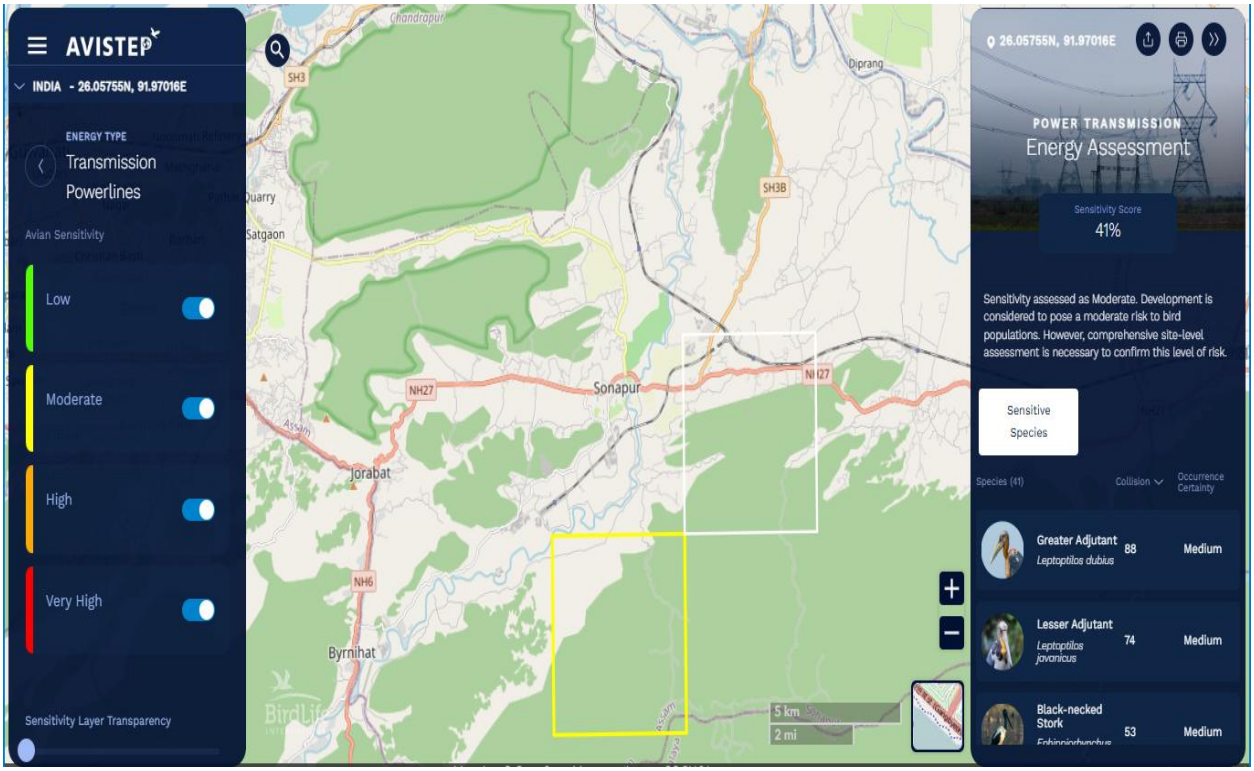
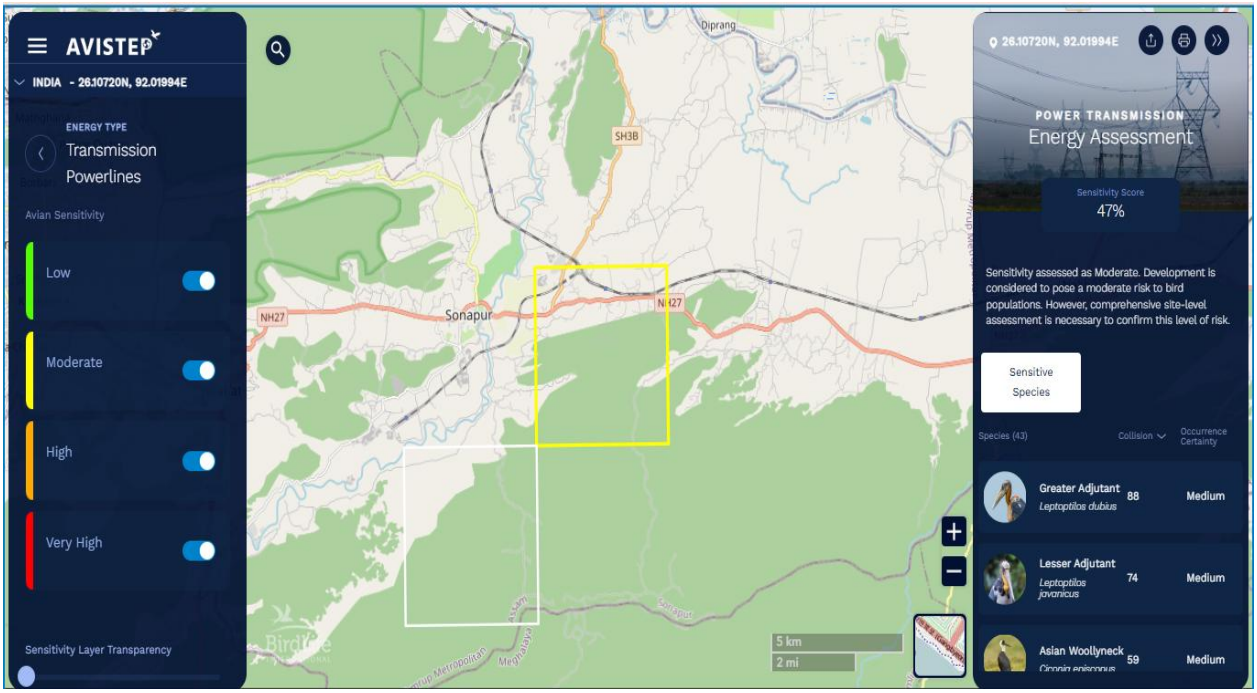
APPENDIX 9: AVIFAUNA DETAILS AS PER AVISTEP ANALYSIS

The avifaunal details has been carried on the basis of AVISTEP analysis in the project area. The entire project section divided into 03 sections i.e sec-1 (Project start location-Byrnihat), sec-2 (Project middle location-Boda Gaon) and sec-3 (Project end location-Sonapur Substation). Maps of all three sections provided below for ready reference. From the AVISTEP Analysis, it is confirmed that the collision sensitivity lies between moderate (sensitivity score 41%) to high (sensitivity score 73%) along with low to medium occurrence certainty.

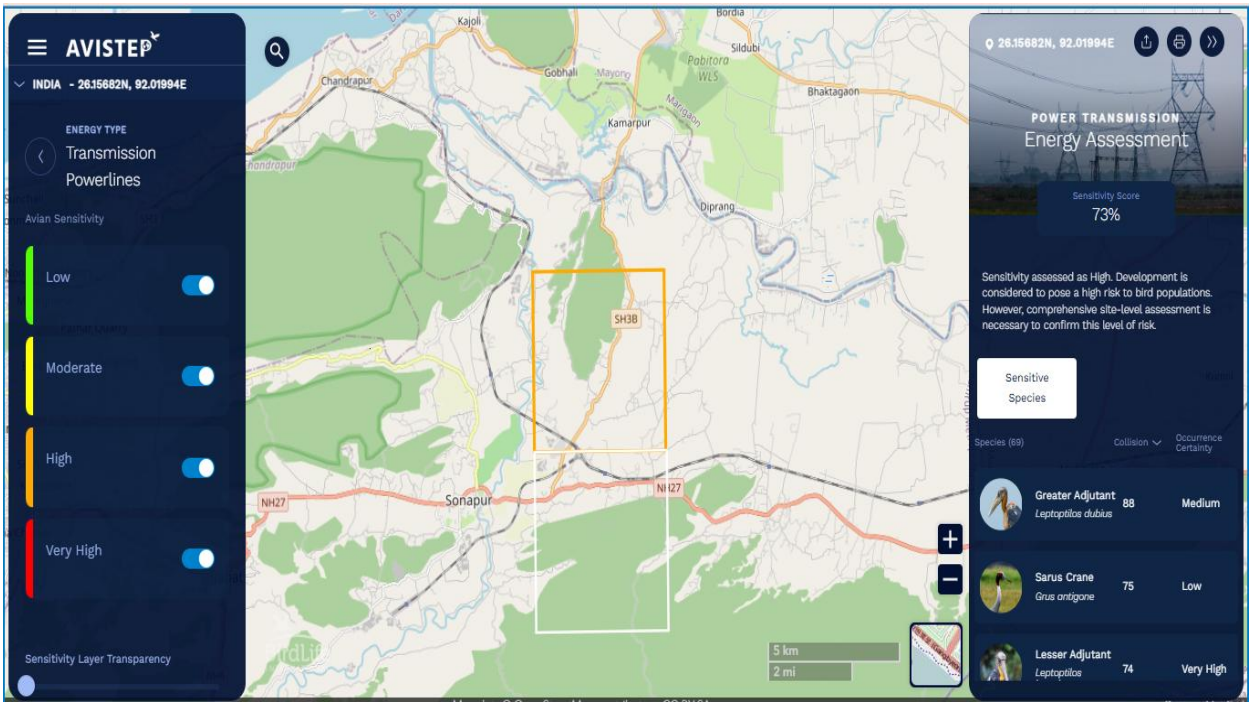
Sec-1: Project Start Point (Byrnihat): Moderate Sensitive



Sec 2. Project Middle Point (Boda Gaon): Moderate Sensitive



Sec 3. Project End Point (220 Kv SS, Sonapur): High Sensitive



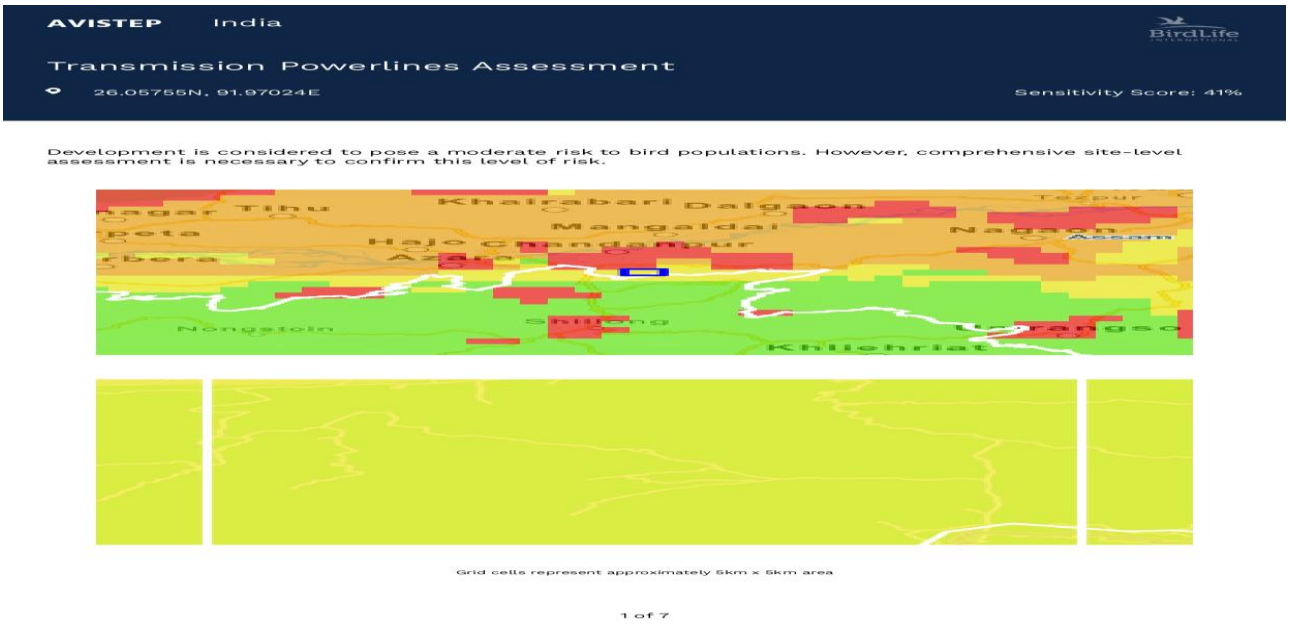
Note: AVISTEP Analysis further recommends to conduct a comprehensive site based assessment to confirm the level of risk.

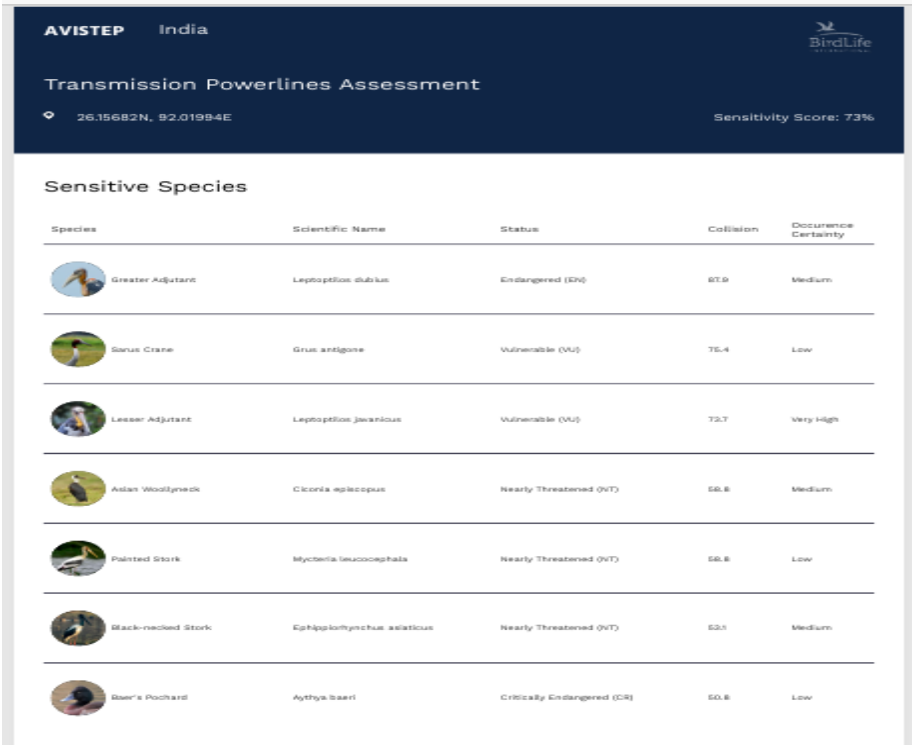
Accordingly a formal meeting has been conducted on dated 17.01.2026 with Range Forest Officer of Sonapur Forest Range (Attendance sheet & Photographs provided) to know about the bird distribution, migration pattern, and risk assessment along with secondary datas. The outcome of the meeting is as below:

1. No bird migration observed in the Sonapur Forest Range (The project area). Only Eagle (Residential bird) spotted in the project area.
2. Mostly the bird migration takes place from Amchang Wildlife Sanctuary to Pobitora Wildlife Sanctuary, which is situated in the extremely opposite site of project area.
3. The main cause behind less bird presence is the presence of Star Cement Factory, Busy Asian Highway-1 and dense habitation in Sonapur Area.

Further the birds migrating from Amchang to Pobitora likely follow the Brahmaputra River Corridor (extreme opposite to the project area), utilizing the wetlands (Beels) like Tamulidoba, Haisora etc., as stopover points, moving along the river's path for feeding and resting between late October and March, connecting the forested areas of Amchang to Pobitora's rich aquatic habitats for wintering.
The Brahmaputra River acts as a natural flyway. Birds fly along the river, using its vast floodplain wetlands for crucial stopovers.
Amchang provides forest and hills, while Pobitora offers extensive wetlands and grasslands, forming a vital ecological link for migratory water birds and other species.

400 kV S/C LILO at Sonapur GIS from 400 kV Silchar – Byrnihat Line





AVISTEP India

BirdLife

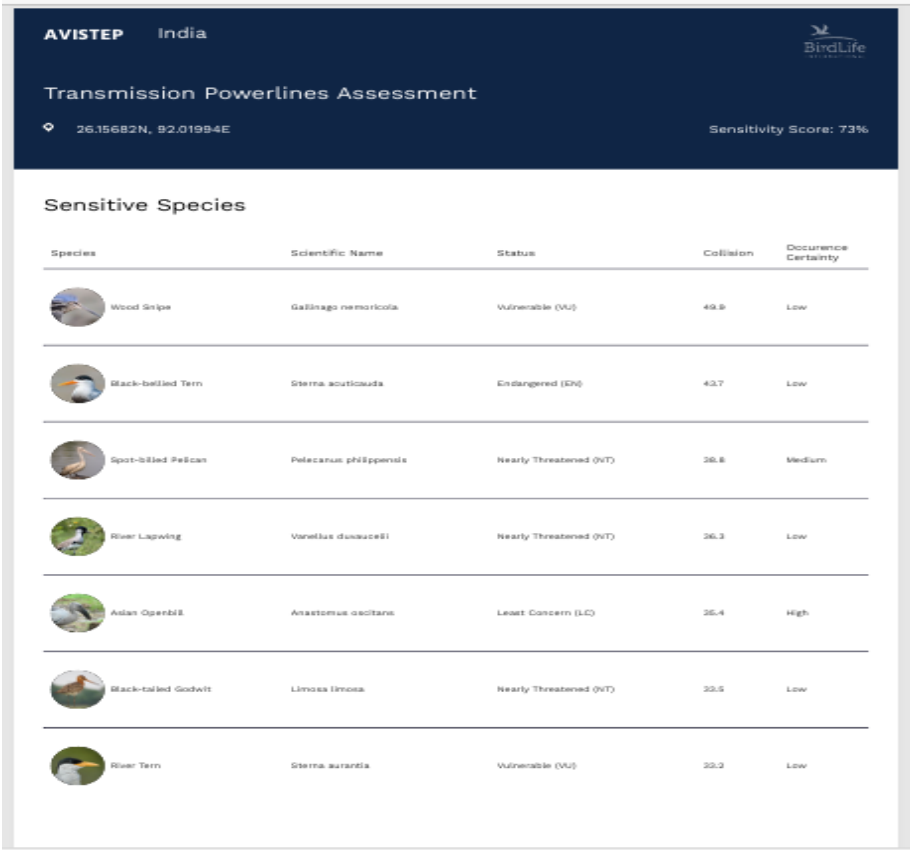
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Greater Adjutant	Leptoptilos dubius	Endangered (EN)	87.9	Medium
Sarus Crane	Grus antigone	Vulnerable (VU)	75.4	Low
Lesser Adjutant	Leptoptilos javanicus	Vulnerable (VU)	72.7	Very High
Asian Woollyneck	Ciconia episcopus	Nearly Threatened (NT)	58.8	Medium
Painted Stork	Mycteria leucocephala	Nearly Threatened (NT)	58.8	Low
Black-necked Stork	Ephippiorhynchus asiaticus	Nearly Threatened (NT)	53.1	Medium
Baer's Pochard	Aythya baeri	Critically Endangered (CR)	50.8	Low



AVISTEP India

BirdLife

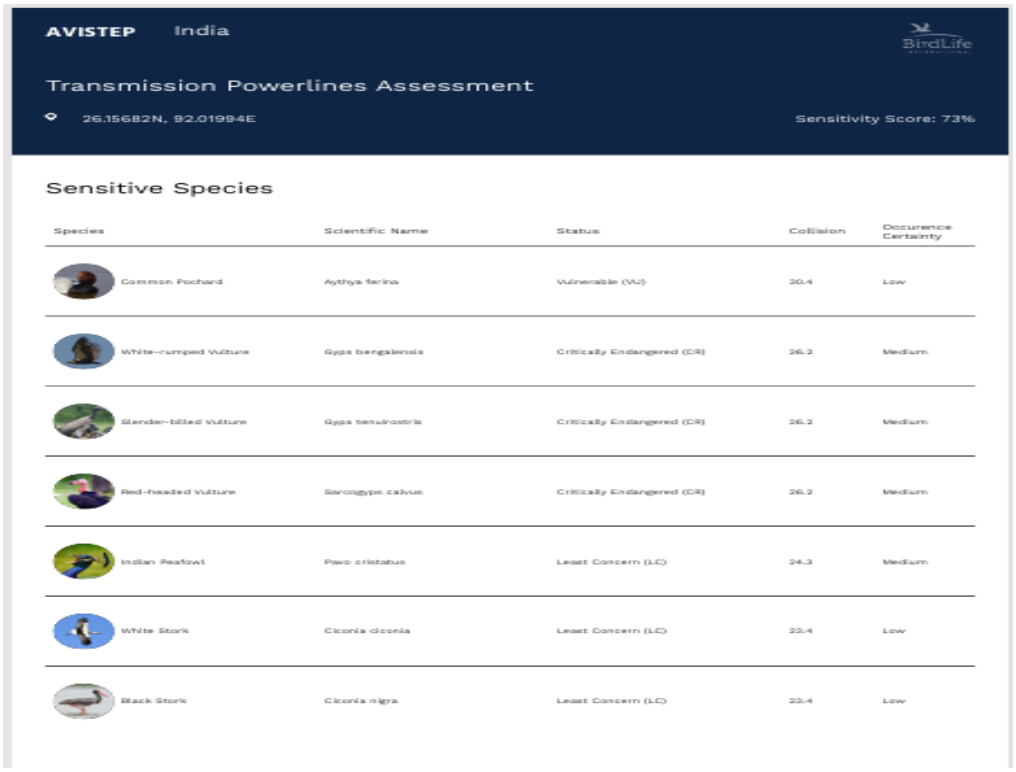
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Wood Snipe	Gallinago nemoricola	Vulnerable (VU)	49.9	Low
Black-bellied Tern	Sterna acuticauda	Endangered (EN)	43.7	Low
Spot-billed Pelican	Pelecanus philippensis	Nearly Threatened (NT)	38.8	Medium
River Lapwing	Vanellus duvaucelii	Nearly Threatened (NT)	36.3	Low
Asian Openbill	Anastomus oscitans	Least Concern (LC)	35.4	High
Black-tailed Godwit	Limosa limosa	Nearly Threatened (NT)	33.5	Low
River Tern	Sterna aurantia	Vulnerable (VU)	33.2	Low



AVISTEP India

BirdLife

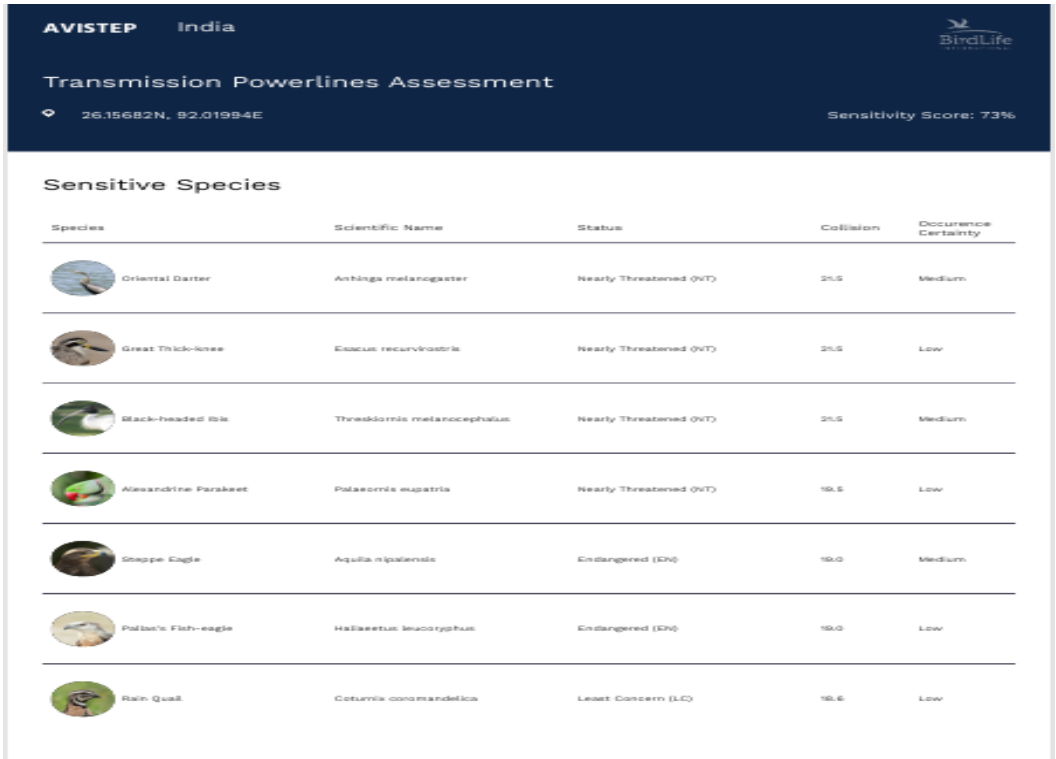
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Common Pochard	Aythya ferina	Vulnerable (VU)	20.4	Low
White-rumped Vulture	Gyps bengalensis	Critically Endangered (CR)	26.2	Medium
Slender-billed Vulture	Gyps tenuirostris	Critically Endangered (CR)	26.2	Medium
Red-headed Vulture	Sarcogyps calvus	Critically Endangered (CR)	26.2	Medium
Indian Peafowl	Pavo cristatus	Least Concern (LC)	24.3	Medium
White Stork	Ciconia ciconia	Least Concern (LC)	23.4	Low
Black Stork	Ciconia nigra	Least Concern (LC)	23.4	Low



AVISTEP India

BirdLife

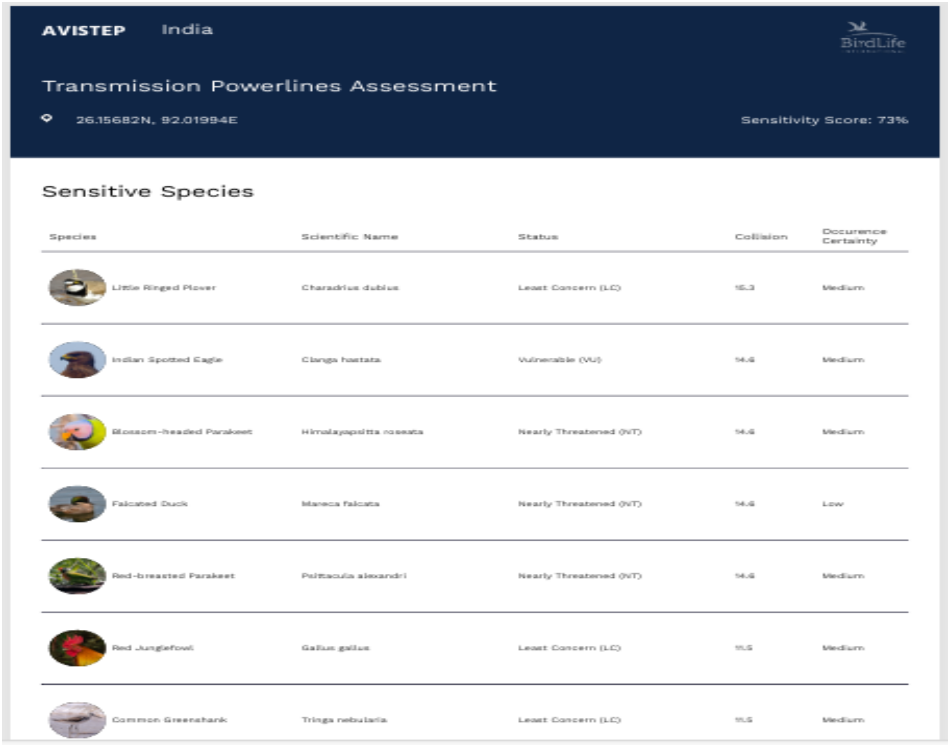
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Oriental Darter	Anhinga melanogaster	Nearly Threatened (NT)	21.5	Medium
Great Thick-knee	Esacus recurvirostris	Nearly Threatened (NT)	21.5	Low
Black-headed Ibis	Threskiornis melanocephalus	Nearly Threatened (NT)	21.5	Medium
Alexandrine Parakeet	Palaeornis eupatria	Nearly Threatened (NT)	19.5	Low
Steppe Eagle	Aquila nipalensis	Endangered (EN)	19.0	Medium
Pallas's Fish-eagle	Haliaeetus leucoryphus	Endangered (EN)	19.0	Low
Rain Quail	Coturnix coromandelica	Least Concern (LC)	18.6	Low



AVISTEP India

BirdLife

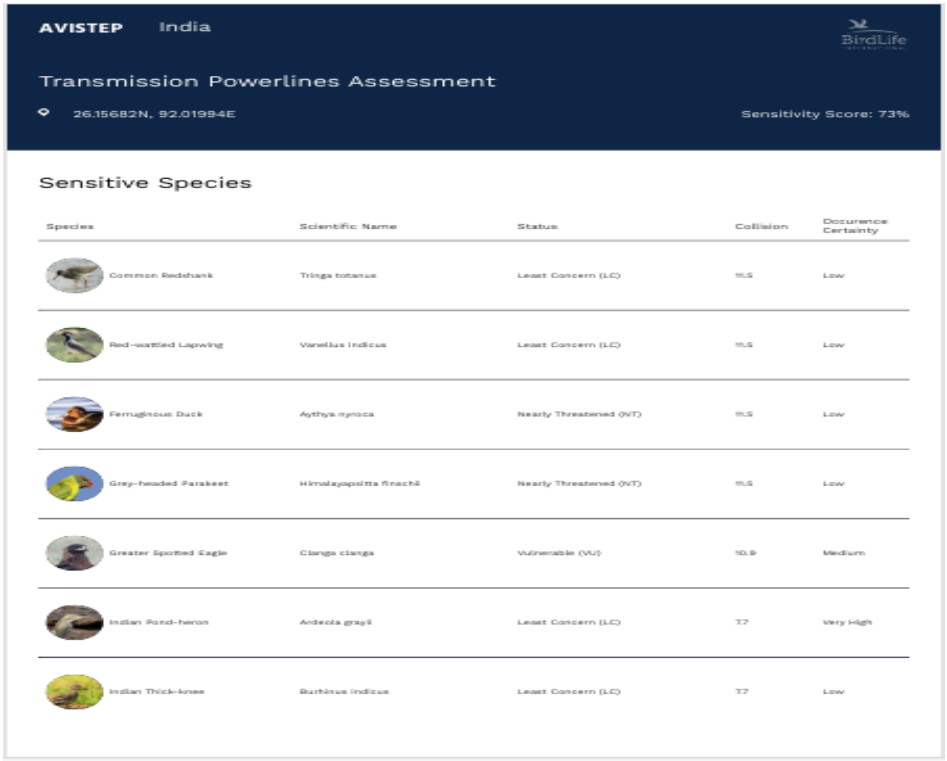
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Little Ringed Plover	Charadrius dubius	Least Concern (LC)	16.3	Medium
Indian Spotted Eagle	Clanga hastata	Vulnerable (VU)	14.6	Medium
Blossom-headed Parakeet	Himalayapsitta roseata	Nearly Threatened (NT)	14.6	Medium
Falcated Duck	Mareca falcata	Nearly Threatened (NT)	14.6	Low
Red-breasted Parakeet	Psittacula alexandri	Nearly Threatened (NT)	14.6	Medium
Red Junglefowl	Gallus gallus	Least Concern (LC)	11.5	Medium
Common Greenshank	Tringa nebularia	Least Concern (LC)	11.5	Medium



AVISTEP India

BirdLife

Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Common Redshank	Tringa totanus	Least Concern (LC)	11.5	Low
Red-wattled Lapwing	Vanellus indicus	Least Concern (LC)	11.5	Low
Ferruginous Duck	Aythya nyroca	Nearly Threatened (NT)	11.5	Low
Grey-headed Parakeet	Himalayapsitta finschi	Nearly Threatened (NT)	11.5	Low
Greater Spotted Eagle	Clanga clanga	Vulnerable (VU)	10.9	Medium
Indian Pond-heron	Ardeola grayii	Least Concern (LC)	7.7	Very High
Indian Thick-knee	Burhinus indicus	Least Concern (LC)	7.7	Low

Transmission Powerlines Assessment

26.15682N, 92.01994E — Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Kentish Plover	Charadrius alexandrinus	Least Concern (LC)	T4	Low
Black Francolin	Francolinus francolinus	Least Concern (LC)	T4	Low
Pintail Snipe	Gallinago stenura	Least Concern (LC)	T4	Low
Pacific Golden Plover	Pluvialis fulva	Least Concern (LC)	T4	Medium
Greater Painted-snipe	Rostratula benghalensis	Least Concern (LC)	T4	Low
Wood Sandpiper	Tringa glareola	Least Concern (LC)	T4	Low
Green Sandpiper	Tringa ochropus	Least Concern (LC)	T4	Low

AVISTEP India

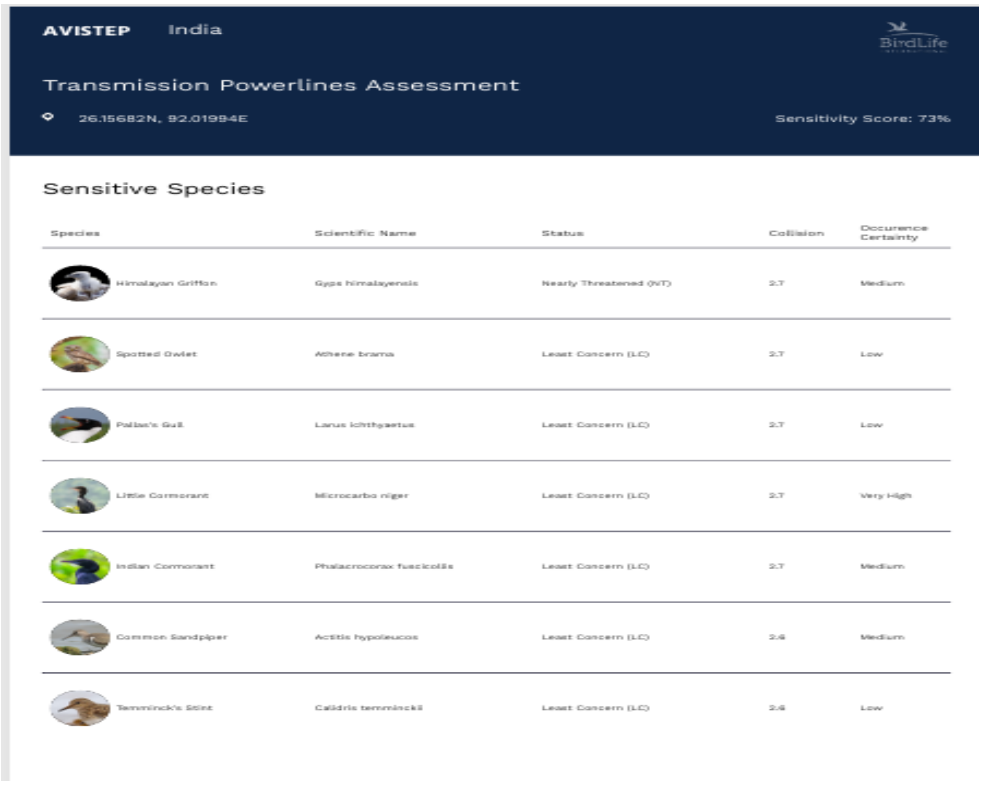
BirdLife

Transmission Powerlines Assessment

26.15682N, 92.01994E — Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Marsh Sandpiper	Tringa stagnatilis	Least Concern (LC)	T4	Low
Barred Buttonquail	Turnix suscitator	Least Concern (LC)	T4	Medium
Yellow-legged Buttonquail	Turnix tanki	Least Concern (LC)	T4	Medium
Grey-headed Lapwing	Vanellus cinereus	Least Concern (LC)	T4	Low
Brown Fish-owl	Ketupa zeylonensis	Least Concern (LC)	5.3	Low
Ashy-headed Green-pigeon	Treron phayrei	Nearly Threatened (NT)	2.5	Medium
Red-headed Falcon	Falco chicquera	Nearly Threatened (NT)	2.7	Medium



AVISTEP India

BirdLife

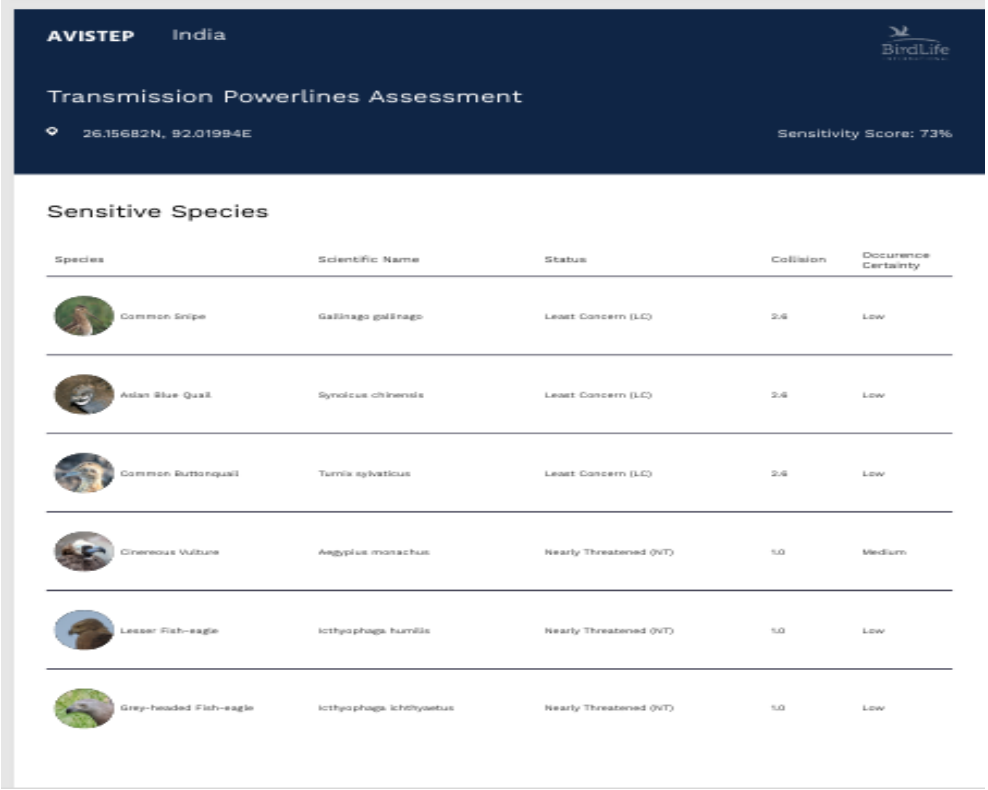
Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Himalayan Griffon	Gyps himalayensis	Nearly Threatened (NT)	2.7	Medium
Spotted Owlet	Athene brama	Least Concern (LC)	2.7	Low
Pallas's Gull	Larus ichthyaetus	Least Concern (LC)	2.7	Low
Little Cormorant	Microcarbo niger	Least Concern (LC)	2.7	Very High
Indian Cormorant	Phalacrocorax fuscicollis	Least Concern (LC)	2.7	Medium
Common Sandpiper	Actitis hypoleucos	Least Concern (LC)	2.6	Medium
Temminck's Stint	Calidris temminckii	Least Concern (LC)	2.6	Low



AVISTEP India

BirdLife

Transmission Powerlines Assessment

26.15682N, 92.01994E

Sensitivity Score: 73%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurence Certainty
Common Snipe	Gallinago gallinago	Least Concern (LC)	2.6	Low
Asian Blue Quail	Synoicus chinensis	Least Concern (LC)	2.6	Low
Common Buttonquail	Turnix sylvaticus	Least Concern (LC)	2.6	Low
Cinereous Vulture	Aegypius monachus	Nearly Threatened (NT)	1.0	Medium
Lesser Fish-eagle	Icthyophaga humilis	Nearly Threatened (NT)	1.0	Low
Grey-headed Fish-eagle	Icthyophaga ichthyaetus	Nearly Threatened (NT)	1.0	Low

Attendance and Photographs of Meeting with Range Forest Officer (Sonapur Forest Range)

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet of Consultation with Range Office

Venue: Range office, Sonapur **Date:** 17/01/2026

SL. No.	Name	Designation	Contact Number	Signature
1	Pranjal Gogoi	Range Officer Sonapur	8999373927	[signature]
2	Khanin Baidya	Social Expert PMU, AEGCL	9864223185	[signature]
3	[illegible]	Social Subgroup, Spark, AIDUL	7002298355	[signature]
4	Bodhaditya Roy	Env. Specialist AEGCL	9706663284	[signature]
5	Parthajit Baidya	Comm. Cons. Officer, TEECL	9699945532	[signature]
6	Rakesh Sadapathy	Env. Specialist	9861106345	[signature]





APPENDIX 10: WORKERS' CODE OF CONDUCT

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WORKERS' CODE OF CONDUCT

I, _____, do hereby acknowledge that preventing any misconduct as stipulated in this code of conduct, including Gender-Based Violence (GBV), Sexual Exploitation and Abuse(SEA)/Sexual Harassment (SH) is important. Any activity that constitutes an act of gross misconduct is therefore ground for sanctions, penalties, termination of employment or even prosecution. All forms of misconduct are unacceptable, be it on the worksite, the worksite surroundings or at worker's camps.

I agree, while working on this project, that I will:

1. Consent to security background checks.
2. Treat women, children (persons under the age of 18) and persons with disability with respect regardless of race, language, religion, political or other opinion, nationality, ethnicity, cultural beliefs/practices, financial or other status.
3. Not use language or behaviour towards men, women or children/learners that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Not participate in sexual activity with children/learners—including grooming or through digital media. Mistaken belief regarding the age of, and consent from, the child is not a defence in the eyes of the law.
5. Not exchange money, employment, goods, or services for sex, with community members, including sexual favours or other forms of humiliation, degrading or exploitative behaviour.
6. Not have sexual interactions with members of the communities surrounding the workplace, worker's camps and fellow workers that are not agreed to, with full consent by all parties involved in the act. This includes relationships involving the withholding, promise of, or actual provision of benefit (monetary or non-monetary) to community members in exchange for sex - such sexual activity is considered "non-consensual" within the scope of this Project.
7. Attend trainings related to HIV/AIDS, GBV (SEA/SH), occupational health and any other relevant courses on safety, as requested by my employer.

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8. Report to the relevant committee, any situation where I may have concerns or suspicions regarding acts of misconduct by a fellow worker, whether in my company or not, or any breaches of this code of conduct.
9. Refrain from any form of theft of assets and facilities, including from surrounding communities.
10. Remain in designated working area during working hours.
11. Ensure that possession of, or being under the influence of alcohol, illegal drugs and other controlled substances in the workplace and during working hours is strictly prohibited.
12. Wear mandatory PPE at all times during work.
13. Follow prescribed environmental and occupational health and safety standards.
14. Channel grievances through the established Grievance Redress Mechanism.

RAISING CONCERNS

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

****ATTESTATION****

I acknowledge that I have read and clearly understand this Code of Conduct, along with the consequences should I refuse to comply.

****WORKER****

Signed by:

Signature and Date: _____

****ENDORSED BY (THE EMPLOYER/SUPERVISOR) ****

Name and Designation:

Signature and Date: _____

_____

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শ্রমিকৰ আচৰণ বিধি

মই,_____ , এই আচৰণ বিধিৰ অধীনস্থ যিকোনো অনিয়ম, যাৰ অন্তর্ভুক্ত লিংগভিত্তিক হিংসা (GBV), যৌনশোষণ আৰু অপব্যৱহাৰ (SEA)/(SH) যৌন হানি ৰ দৰে কার্য লগত জড়িত ব্যক্তিক আটক কৰাটো অতি গুৰুত্বপূর্ণ বুলি বিশ্বাস কৰোঁ। যিকোনো ধৰণৰ গম্ভীৰ অনিয়মৰ দৰে কার্যত লিপ্ত থাকিলে আইনসন্মত ভাবে দণ্ডনীয় আৰু ইয়াৰ বাবে চাকৰিৰ পৰা বহিষ্কাৰ বা আইনী পদক্ষেপ গ্রহণৰ ব্যৱস্থা আছে। কামৰ ঠাই আৰু সেই স্থানৰ পৰিৱেশ বা শ্রমিক শিবিৰত এই ধৰণৰ সকলো আচৰণ গ্রহণযোগ্য নহয়।

মই এই প্রকল্পত কাম কৰি থাকোতে, নিম্নলিখিত নিয়মসমূহ মানি চলিম:

১. নিৰাপত্তা জনিত নিয়মাৱলী সমূহ ভালদৰে মানি চলিম।

২. মহিলা, শিশু (১৮ বছৰৰ তলৰ লোক) আৰু শাৰীৰিক ভাৱে অক্ষম ব্যক্তিসকলক জাতি, ভাষা, ধর্ম, ৰাজনৈতিক মতামত, জাতীয়তা, সাংস্কৃতিক বিশ্বাস/অনুশীলন, অর্থনৈতিক বা অন্য স্থিতিৰ পৰা নিৰপেক্ষভাৱে সন্মান প্রদর্শন কৰিম।

৩. পুৰুষ, মহিলা বা শিশু/বিদ্যার্থীৰ সৈতে অপ্রাসঙ্গিক, অপমানজনক, যৌন হানি অথবা যৌন উৎপিড়ন দৰে কার্য কলাপৰ লগতে অপ্রিতিকৰ ভাষা বা আচৰণ প্রদর্শন নকৰোঁ।

৪. শিশু/বিদ্যার্থীৰ সৈতে যৌন সম্পর্কত লিপ্ত নহওঁ— এয়া ডিজিটেল মাধ্যমেৰে জৰিয়ত হওঁক বা অন্য উপায়ৰে হ'লেও। শিশুৰ বয়সৰ সম্পর্কত ভুল ধাৰণা বা তেওঁৰ অনুমতি থকাৰ ভুল ব্যাখ্যা আইনগত ভাবে গ্রহণযোগ্য নহয়।

৫. বিশেষ সম্প্রদায়ৰ সদস্যসকলৰ সৈতে যৌন সুবিধাৰ বিনিময়ত ধন, চাকৰি, সামগ্রী বা সেৱা দান নকৰোঁ, বা অন্য কোনো অপমানজনক অথৱা শোষণমূলক আচৰণ নকৰোঁ।

৬. কর্মক্ষেত্র, শ্রমিকৰ শিবিৰ আৰু সহকর্মীসকলৰ সৈতে বা আশে-পাশে থকা সম্প্রদায়ৰ সদস্যসকলৰ সৈতে যৌন সম্পর্ক স্থাপন নকৰোঁ। ইয়াৰ ভিতৰত যৌনতাৰ বিনিময়ত সম্প্রদায়ৰ সদস্যসকলক সুবিধা (আর্থিক বা অ-আর্থিক) ৰখা, প্রতিশ্রুতি দিয়া বা প্রকৃততে প্রদান কৰা সম্পর্কসমূহো অন্তর্ভুক্ত - এনে যৌন কার্য্যকলাপক এই প্রকল্পৰ পৰিসৰৰ ভিতৰত "অসন্মতিসূচক" বুলি গণ্য কৰা হয়।

৭. লিংগভিত্তিক হিংসা, যৌনশোষণ আৰু যৌন হানিৰ অপব্যৱহাৰপ্রতিৰোধ কৰা প্রশিক্ষণত আৰু কার্য কর্মক্ষেত্রৰ স্বাস্থ্য আৰু নিৰাপত্তা সম্পর্কীয় প্রশিক্ষণত অংশগ্রহণ কৰিম।

৮. কোনো সহকর্মী (আমাৰ কোম্পানীৰ, বা অন্য কোম্পানীৰ) সৈতে অনৈতিক আচৰণ সংঘটিত হোৱাৰ সন্দেহ থাকিলে, আমি সংশ্লিষ্ট সমিতিক অৱগত কৰিম।

৯. কর্মসংস্থান আৰু কর্মসংস্থান লগত জড়িত সম্প্রদায়ৰ সম্পত্তিত কোনো ধৰণৰ চুৰি নকৰোঁ।

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১০. কর্ম ঘণ্টাৰ সময়ত নির্ধাৰিত কামৰ স্থানত উপস্থিত থাকিম।

১১. কর্মঘণ্টাৰ সময়ত মাদক, সুৰা বা নিষিদ্ধ বস্তু ব্যৱহাৰ নকৰোঁ।

১২. কর্মক্ষেত্রত নির্ধাৰিত ব্যক্তিগত সুৰক্ষা সঁজুলি (PPE) সদায় পৰিধান কৰিম।

১৩. পৰিবেশ আৰু কর্মক্ষেএৰ স্বাস্থ্য আৰু নিৰাপত্তাৰ নির্ধাৰিত মানদণ্ড মানি চলিম।

১৪. অভিযোগৰ ক্ষেত্রত স্থাপন কৰা অভিযোগ নিষ্পত্তি প্রক্রিয়া (Grievance Redress Mechanism) অনুসৰণ কৰিম।

অভিযোগ উত্থাপন

এই আচৰণ বিধিত নিষিদ্ধ যিকোনো কার্য সম্পর্কে অভিযোগ উত্থাপন কৰা যিকোনো ব্যক্তিৰ ওপৰত কোনো ধৰনৰ ব্যৱস্থা প্রতিশোধমূলক কার্য হাতত লওঁও। এনে প্রতিশোধমূলক কার্য্য এই আচৰণ বিধিৰ উলংঘন হিচাপে গণ্য কৰা হ'ব।

আচৰণ বিধি উলংঘনৰ ফলাফল

এই আচৰণ বিধি উলংঘন কৰিলে গভীৰ ফলাফলৰ সন্মুখীন হ'ব লাগিব, যাৰ অন্তর্ভুক্ত চাকৰিৰ পৰা বহিষ্কাৰ বা আইনী ব্যৱস্থা গ্রহণও অন্তর্ভুক্ত হ'ব পাৰে।

স্বীকাৰোক্তি

মই এই আচৰণ বিধি পঢ়িছোঁ আৰু ইয়াৰ বিধি-বিধান আৰু প্রযোজ্য পৰিণামবোৰ সম্পূর্ণৰূপে বুজি পাইছোঁ।

শ্রমিক স্বাক্ষৰ আৰু তাৰিখ:

অনুমোদন (নিয়োগকর্তা/পৰিদর্শক)_____

নাম আৰু পদবি:_____

স্বাক্ষৰ আৰু তাৰিখ: _____

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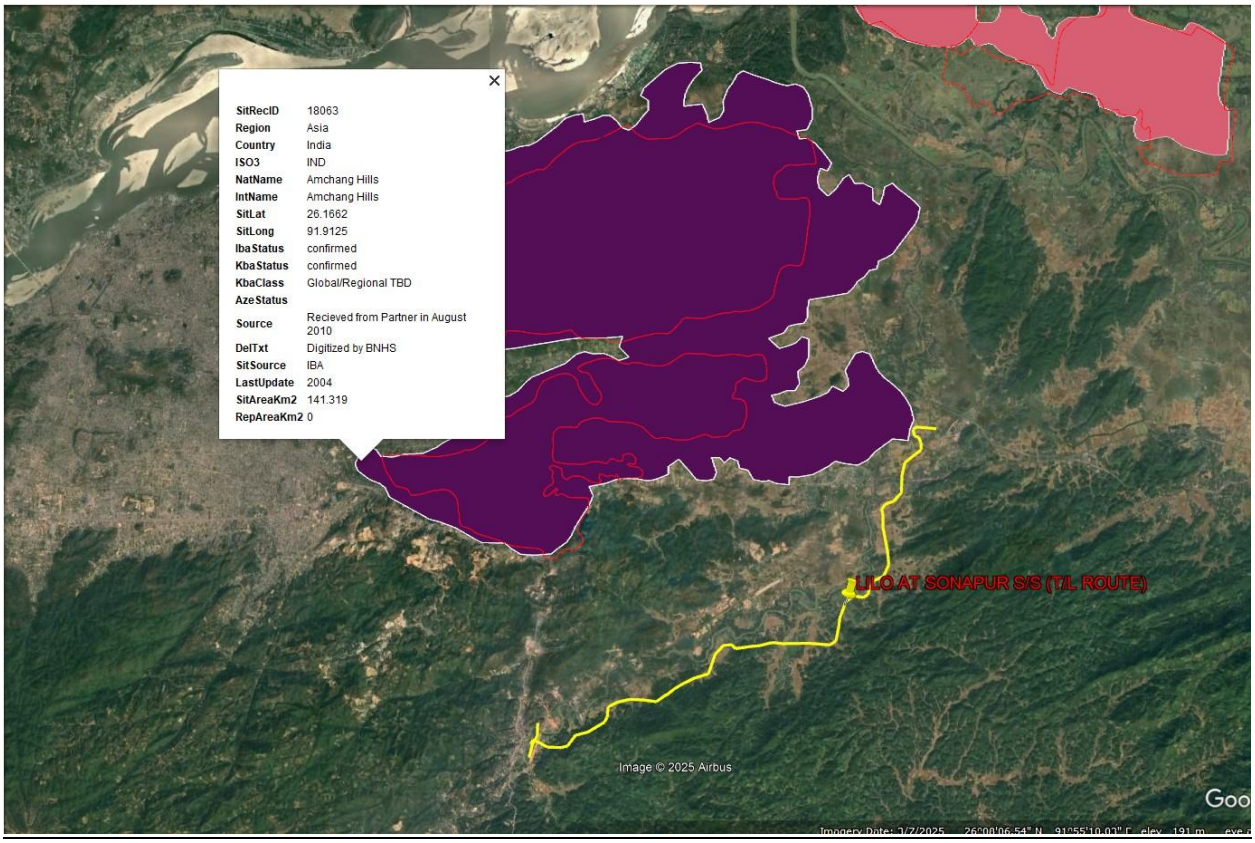
APPENDIX 11: MAP SHOWING LOCATION OF NEAREST IBA SITE (AMCHANG WLS) WRT PROJECT AREA



APPENDIX 12: DETAILS OF IBA SITES OF ASSAM

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA – ASSAM

IN-AS

IBAs of Assam		
IBA site codes	**IBA site names**	**IBA criteria**
IN-AS-01	Amchang Wildlife Sanctuary	A1
IN-AS-02	Barail Range	A1, A2, A3
IN-AS-03	Barnadi Wildlife Sanctuary	A1
IN-AS-04	Bauwwa *Beel*	A1
IN-AS-05	Behali Reserve Forest	A1, A3
IN-AS-06	Bherjan-Borajan-Podumoni Wildlife Sanctuary	A1
IN-AS-07	Bordoibam-Bilmukh Bird Sanctuary	A1
IN-AS-08	Bordoloni-Samporu	A1, A2, A4i
IN-AS-09	Chakrashila Complex	A1, A4i, A4iii
IN-AS-10	Chandubi Lake and adjoining areas	A1
IN-AS-11	Deoball Jalah	A1, A4i
IN-AS-12	Dhansiri Reserve Forest	A1, A4i
IN-AS-13	Dibru-Saikhowa Complex	A1, A2
IN-AS-14	Deepor *Beel* Sanctuary	A1, A4iii
IN-AS-15	Dum Duma-Dangori & Kumsong Reserve Forests	A1
IN-AS-16	East and North Karbi Anglong Wildlife Sanctuaries	A1
IN-AS-17	Garampani, Nambor and Doigrung	A1
IN-AS-18	Hollongapar Gibbon Sanctuary	A1
IN-AS-19	Hubong and Umru	A4ii
IN-AS-20	Inner Line (East), Katakhal and Barak Reserve Forests	A1
IN-AS-21	Jamjing and Sengajan	A1
IN-AS-22	Jatinga	A1, A4iv
IN-AS-23	Jengdia *Beel* and Satgaon	A1
IN-AS-24	Jhanjimukh-Kokilamukh	A1, A4i
IN-AS-25	Kaziranga National Park	A1, A2, A4i, A4iii
IN-AS-26	Kuarbari-Dalani	A1
IN-AS-27	Langting-Mupa Reserve Forest	A1
IN-AS-28	Laokhowa and Burhachapori Sanctuaries	A1, A2
IN-AS-29	Lumding Reserve Forest	A1
IN-AS-30	Majuli Island	A1, A4iii
IN-AS-31	Manas National Park	A1, A2
IN-AS-32	Nameri National Park	A1, A2
IN-AS-33	Orang National Park	A1, A4i
IN-AS-34	Pabho Reserve Forest	A1, A2
IN-AS-35	Pobitora Wildlife Sanctuary	A1, A2, A4iii
IN-AS-36	Pani-Dihing Bird Sanctuary	A1, A4iii
IN-AS-37	Ripu Reserve Forest	A1, A2
IN-AS-38	Sibsagar Tanks	A1, A4i
IN-AS-39	Son *Beel*	A1
IN-AS-40	Sonai-Rupai Wildlife Sanctuary	A1
IN-AS-41	Subansiri Dulung	A1, A2
IN-AS-42	Tamaranga-Doloci-Bhairab Complex	A1, A4iii
IN-AS-43	Tirap-Barbidibing	A1
IN-AS-44	Upper Dihing (East) Complex	A1, A2
IN-AS-45	Upper Dihing (West) Complex	A1, A2
IN-AS-46	Urpod *Beel*	A1, A4iii
IN-AS-47	Barail Wildlife Sanctuary	A1, A2, A3
IN-AS-48	Chirang Reserve Forest	A1, A2
IN-AS-49	Dadara-Pasariya Singimari	A1
IN-AS-50	Innerline (West) and Kathalkal Reserve Forest	A1
IN-AS-51	Krungming Reserve Forest, Khorongma & Kopili-Umrangsu Reservoir	A1, A4ii
IN-AS-52	Maguri and Motapung Beels	A1, A2
IN-AS-53	Manas Reserve Forest	A1, A2
IN-AS-54	Marat Longri Wildlife Sanctuary	A1
IN-AS-55	Saroswar Beel	A1, A4iii

APPENDIX 13: DETAILS OF TREE ENUMERATION REPORT

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
			EXT.-577 TO AP-I			
1	Banana			L		250
2	Banana				R	250
3	Sajna	1.3	5	L		1
4	Tamul	0.32	4	L		3
5	Sajna	0.62	3	L		1
6	Tamul	0.41	6		R	7
7	Teak	2.4	8		R	1
8	Teak	3	10		R	1
			AP-I TO AP-IA			
1	Sajna	0.62	5	L		1
2	Jackfruit	1.2	6	L		1
3	Bogori	0.74	4	L		1
4	Tamul	0.4	4	L		1
5	Mango	0.25	4	L		1
6	Mango (Chara)		2	L		1
7	Banana (Jahagi)			L		8
8	Nimbu Chara			L		1
9	Velco	1.5	10		R	1
10	Velco	1.3	12		R	1
11	Velco	1.7	15		R	1
12	Sajna	0.62	5		R	1
13	Tamul	0.35	7		R	10
14	Tamul	0.35	7		R	20
15	Sajna	1	5		R	1
16	Sajna	0.75	6		R	1
17	Sajna	1.3	5		R	1
18	Sajna	0.75	2		R	1
19	Sajna	1.52	6		R	1
20	Sajna	0.62	4		R	1
21	Sajna	0.75	5	L		1
22	Tamul	0.45	7	L		3
23	Sajna	1.3	6	L		1
24	Sajna	1.2	2	L		1
25	Sajna	0.52	2	L		1
26	Gamri	1.5	12		R	1
27	Dumur	0.65	6		R	1
28	Jackfruit	0.45	4		R	1
29	Sajna	0.85	4		R	2
30	Dumur	0.4	3		R	1
31	Sajna	0.4	2		R	1
32	Tamul	0.32	4		R	6
33	Valuka Bamboo		15-20		R	250
34	Tamul Chara				R	62
35	Nimbu Chara				R	13
36	Houla	0.84	5	L		1
37	Velco	1.5	14	L		1
38	Mango	0.3	3	L		1
39	Unknown	0.84	7	L		1
40	Sajna	1.2	4	L		1
41	Bamboo(Jati)		7-10			10
42	Tamul	0.42	6			67
43	Koroi	1	4		R	1
44	Teak	2.7	12		R	1
45	Jackfruit	0.54	5		R	1
46	Teak	0.4	4		R	1
47	Sajna	0.71	4		R	3
48	Gamari	1	7		R	1
49	Gamari	0.52	5		R	1
50	Sajna	0.64	3		R	1
51	Unknown	0.52	4		R	1
52	Gamari	1	15		R	1

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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
			AP-1A TO AP-2			
1	Sajna	0.72	4	L		3
2	Teak	0.62	6	L		1
3	Nimbu Chara			L		2
4	Nimbu Chara			L		10
5	Tamul	0.4	5	L		45
6	Tamul Chara			L		11
7	Amrut	0.52	5	L		4
8	Nimbu			L		50
9	Nimbu			L		5
10	Tamul	0.45	6	L		100
11	Tamul	0.4	6		R	600
12	Modhuri	0.4	4	L		2
13	Puma	0.3	5	L		1
14	Mango	0.5	5	L		1
15	Mango (Chara)		3	L		5
16	Jamun Chara			L		2
17	Sajna	0.3	3	L		4
18	Jamun	0.55	6	L		1
19	Coconut		3	L		3
20	Coconut		3		R	1
21	Mango	0.6	5		R	1
22	Jamun	0.6	5		R	1
23	Mango (Chara)				R	7
24	Gamari	0.9	6		R	1
25	Gamari	0.7	7		R	1
26	Sajna	0.3	4		R	8
27	Gamari	0.6	8		R	2
28	Jackfruit	0.4	5		R	1
29	Jackfruit	0.3	4	L		3
30	Otanga	0.4	3	L		1
31	Tamul	0.3	5	L		70
32	Tamul Chara			L		20
33	Tamul	0.3	5		R	60
34	Tamul Chara				R	30
35	Tita sopa	0.5	5	L		1
36	Coconut Chara				R	15
37	Banana			L		30
38	Banana				R	30
39	Houla	0.4	4	L		1
40	Mango	0.4	4		R	1
41	Valuka Bamboo				R	120
42	Banana				R	35
			AP-2 TO AP-3			
			Some Portion Non Forest (No Tree) & Some portion Forest, Forest part Tree marking hold.			
			AP-3 TO AP-7			
			Forest			
			AP-7 TO AP-8			
			Some Portion Non Forest & Some portion Forest, both part Tree marking hold.			
			AP-08 TO AP-09			
1	Teak	0.8	9		R	1
2	Teak	1.7	20		R	3
3	Teak	1.7	25		R	1
4	Teak	0.95	12		R	1
5	Sajna	0.5	3		R	2
6	Valuka Bamboo		8		R	635
7	Bamboo(Bijli)		5		R	70
8	Teak	1.2	13		R	1
9	Teak	0.5	9		R	1
10	Teak	0.3	3		R	1
11	Teak	1.7	26		R	1
12	Teak	1.6	15		R	1
13	Teak	0.4	12		R	10

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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
14	Teak	1.75	25	L		2
15	Teak	1	20	L		1
16	Teak	1.5	15	L		1
17	Teak	1.8	24	L		1
18	Teak	1.7	20	L		1
19	Teak	0.8	7	L		1
20	Teak	1	14	L		1
21	Teak	1.7	30	L		1
22	Teak	1.55	13	L		1
23	Teak	1.55	25	L		1
24	Teak	1.3	9	L		1
25	Teak	1.4	4	L		1
26	Teak Chara			L		6
27	Teak Chara		12		R	3
28	Tamul	0.4	8	L		60
29	Puma	0.5	4	L		1
30	Sajna	0.3		L		4
31	Nimbu Chara			L		10
32	Tamul	0.3	3	L		5
33	Tamul	0.3	3		L	15
34	Jackfruit	3	16	R		1
35	Mango	0.6	6	R		1
36	Jiya	0.3	5	R		1
37	Tamul	0.4	12	R		70
38	Tamul Chara	0.3	3	R		30
39	Tamul	0.4	12		L	40
40	Tamul Chara	0.3	3		L	50
41	Banana			R		40
42	Banana				L	40
43	Jackfruit	2.9	30	R		1
44	Unknown	0.3	5	R		1
45	Sajna	0.9	5	R		2
46	Monishal	1	10	R		1
47	Tamul	0.4	12		L	60
48	Tamul	0.3	3		L	20
49	Sajna	1	8		L	1
50	Sajna	0.6	6	R		2
51	Tamul	0.4	12	R		110
52	Tamul	0.3	3	R		20
53	Jackfruit	1.7	14		L	1
54	Dumur	0.4	3	R		1
55	Mango (Chara)		2	R		1
56	Dumur	0.7	5	R		1
57	Dumur	0.4	3	R		1

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
AP-09 TO AP-10						
1	Coconut	1.3	5	R		1
2	Sajna	1.32	3	R		1
3	Nimbu Chara			R		2
4	Karamcha	0.6	5	R		1
5	Tamul	0.3	3	R		4
6	Tamul Chara			R		16
7	Bogori	0.55	4	R		1
8	Sajna	0.4	4	R		1
9	Unknown	3.5	10	R		1
10	Banana		3	R		150
11	Papaya	0.3	3	R		10
12	Bel	1.4	7	R		1
13	Sajna	0.9	3	R		1
14	Tamul	0.4	12	R		102
15	Dumur	0.3	3	R		2
16	Tamul	0.3	2	R		60
17	Papaya	0.6	6	R		4
18	Tamul Chara			R		15
19	Sajna	0.5	4	R		3
20	Teak	1.6	15	R		1
AP-10 TO AP-11						
		No Tree				
AP-11 TO AP-12						
1	Hatikunia			L		3
2	Hatikunia				R	4
3	Velco	1.2	7	L		1
AP-12 TO AP-13						
1	Bamboo (Talta)			L		400
2	Tamul	0.4	10		R	47
3	Sajna	0.4	3		R	3
4	Jackfruit	0.6	9		R	2
5	Jackfruit	0.5	7		R	2
6	Hatikunia	0.7	6		R	1
7	Vatgila	1	7		R	1
8	Litchi	0.5	4		R	1
9	Modhuri	0.4	3		R	1
10	Sajna	0.4	4		R	3
11	Sajna	0.9	4		R	3
12	Karamcha	0.3	3		R	1
13	Neem	0.2	2		R	1
14	Papaya	0.3	3		R	1
15	Tamul Chara				R	2
16	Heuali	0.2	3		R	2
17	Hatikunia	0.7	10		R	2
18	Bamboo(Jati)				R	50
19	Aalat	1	9		R	2
20	Heuali	1.4	13		R	1
AP-13 TO AP-14 (Non Forest Part)						
1	Shirish	0.9	1	L		3
2	Shirish	0.3	3	L		2
3	Shirish	1.1	10	L		1
4	Coconut	1	8	L		1
5	Bogori	0.3	2	L		1
6	Tamul	0.4	12	L		80
7	Gamari	0.9	9	L		1
8	Nimbu	0.2	3	L		1
9	Sajna	1	5	L		1
10	Otenga	0.3	3	L		3
11	Bamboo(Bijli)		6	L		60

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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
			AP-13 TO AP-14			
			Forest part Tree marking hold.			
			AP-14 TO AP-17			
			Forest			
			AP-17 TO AP-18			
			Forest part Tree marking hold.			
			AP-17 TO AP-18 (Non Forest Part)			
1	Tamul	0.45	6	L		45
2	Tamul Chara		2		R	20
3	Gamari	1.35	7		R	1
4	Modhure (Chara)	0.25	2	L		2
5	Banana		4	L		5
6	Puma	0.35	4		R	1
7	Tamul	0.45	6		R	70
8	Jiya	1.52	6		R	18
9	Unknown	0.82	8		R	1
10	Tamul	0.49	6		R	18
11	Sajna	0.34	4	L		1
12	Sajna	0.34	4		R	1
13	Tamul Chara		2	L		15
14	Bamboo(Jati)		10-12		R	50
15	Jamuk	0.98	7		R	1
16	Houla	0.95	7		R	1
17	Jamuk	1.2	7		R	1
18	Houla	1.5	7	L		1
19	Houla	1.45	7	L		1
20	Bamboo(Jati)		10-15		R	10
21	Unknown	0.92	8		R	1
22	Khujli	2.08	15		R	1
23	Houla	1.52	15	L		1
24	Khujli	1.02	12	L		1
25	Tamul	0.32	6	L		50
			AP-18 TO AP-19			
1	Tamul Chara	0.25	3		R	40
2	Tamul	0.25	3	L		50
3	Aahat	3.6	6		R	1
4	Gamari	0.65	5		R	1
5	Koroi	0.72	6		R	1
6	Houla	0.68	7		R	1
7	Aahat	1.25	7		R	1
8	Jamuk	0.84	7		R	1
9	Houla	0.65	6		R	1
10	Khujli	1.58	7		R	1
11	Houla	0.25	6		R	1
12	Houla	0.25	6		R	1
13	Banana		3	L		10
14	Banana		3		R	10
15	Tamul Chara	0.29	2		R	150
16	Tamul	0.29	2	L		130
17	Bamboo(Jati)		10-12		R	70
18	Tamul	0.35	8	L		15
19	Bamboo(Bijli)		7		R	100
20	Jackfruit	0.25	4		R	1
21	Tamul	0.39	6		R	70
22	Banana		4		R	20
23	Tamul Chara	0.31	2		R	40
24	Gamari	1.02	7		R	1
25	Hatikuna	0.35	4		R	1
26	Hatikuna	0.45	5		R	1



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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
AP-19 TO AP-20						
1	Sajna	0.65	4	L		1
2	Sajna	0.45	5	L		1
3	Sajna	0.65	6	L		1
4	Sajna	0.92	7	L		1
5	Sajna	0.48	8	L		1
6	Sajna	0.85	9	L		1
7	Tamul	0.45	7	L		10
8	Velco	0.52	4	L		1
9	Banana		4	L		30
AP-20 TO AP-21						
1	Karamcha	0.52	3	L		1
2	Karamcha	0.57	3	L		1
3	Satiana	1.05	5	L		1
4	Dumur	0.95	4	L		1
5	Bogori	0.49	3	L		1
6	Bogori	0.48	3	L		1
AP-21 TO AP-22						
1	Karamcha	0.49	4	L		1
2	Karamcha	0.25	4		R	2
3	Karamcha	0.25	4	L		1
4	Velco	0.25	4	L		1
AP-22 TO AP-23						
1	Tamul	0.25	1	L		70
2	Tamul	0.25	1		R	95
3	Karamcha	0.52	3	L		1
4	Karamcha	0.49	3	L		1
5	Sajna	0.26	2	L		1
6	Karamcha	0.37	2	L		1
7	Karamcha	0.42	2	L		1
8	Karamcha	0.38	2	L		1
9	Jhelik	3.02	5	L		1
10	Sajna	1.35	4		R	1
11	Sajna	0.25	3		R	1
12	Sajna	0.37	3		R	1
13	Saura	1.25	4		R	1
14	Saura	1.49	4		R	1
15	Sajna	0.95	3		R	1
16	Sajna	0.42	3		R	1
17	Sajna	0.48	3		R	1
18	Sajna	0.35	3		R	1
19	Sajna	0.42	3		R	1
20	Karamcha (Chara)	0.15	2		R	20
21	Karamcha (Chara)	0.15	2	L		30



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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
22	Tamul	0.25	2		R	5
23	Coconut	0.42	2		R	5
24	Banana		3		R	10
25	Sajna	0.65	3	L		1
26	Sajna	0.49	3	L		1
27	Coconut	0.48	2	L		1
28	Banana		4	L		30
29	Bogori	0.25	2		R	1
30	Kadam	0.35	4		R	1
31	Mahogini	0.25	4		R	2
32	Sajna	0.98	4		R	1
33	Banana		5		R	20
34	Velco	0.25	3		R	1
35	Banana		4	L		40
36	Dumur	0.65	4		R	1
37	Gamari	0.74	4	L		1
38	Velco	0.48	4	L		1
39	Velco	0.45	4	L		1
40	Modhuri	0.25	4	L		4
41	Modhuri	0.45	4	L		5
42	Otanga	0.25	3	L		4
43	Coconut		4	L		1
44	Mango	0.25	4	L		4
45	Amla	0.15		L		1
46	Tamul	0.45	4	L		25
47	Bamboo(Jati)		10		R	30
48	Tamul	0.45	7		R	4
49	Tamul	0.45	7	L		3
			AP-23 TO AP-24			
1	Gajamoni	0.75	7		R	1
2	Gajamoni	0.48	6		R	1
3	Ajar	0.98	5		R	1
4	Velco	0.95	5		R	1
5	Dumur	0.25	4		R	1
6	Dumur	0.35	4		R	1
7	Dumur	0.25	4		R	1
8	Dumur	0.49	4		R	1
9	Bogori	0.52	4		R	1
10	Ajar	3.25	9	L		1
11	Sajna	0.65	4	L		1
12	Sajna	0.75	4		R	1
13	Velco	1.25	4	L		1
14	Sajna	0.95	4	L		1
15	Madhar	0.95	6	L		1
16	Madhar	0.85	6	L		1
17	Velco	1.28	6		R	1
			AP-24 TO AP-25			
1	Sajna	1.05	4	L		1
2	Sajna	0.65	4		R	1
3	Sajna	0.85	4		R	1
4	Sajna	0.72	4		R	1
5	Tamul	0.49	6		R	25
6	Sajna	0.65	4	L		1
7	Sajna	0.49	4	L		1
8	Sajna	0.48	4	L		1
9	Teak	0.65	6	L		1
10	Teak	0.7	6	L		1
11	Teak	0.98	6	L		1
12	Jackfruit	1.05	7	L		1
13	Karamcha	0.25	3	L		1
14	Sajna	0.65	4	L		1
15	Sajna	0.68	3	L		1
16	Sajna	0.25	3	L		1
17	Sajna	0.49	3	L		1
18	Sajna	0.48	3	L		1
19	Gamari	1.05	7	L		1

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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
20	Tamul	0.48	8	L		60
21	Karamcha	0.62	4	L		1
22	Karamcha	0.67	4	L		1
23	Tamul Chara	0.25	2	L		30
24	Tamul	0.49	6		R	30
25	Tamul Chara	0.28	2		R	20
26	Teak	0.45	5		R	1
27	Teak	0.65	5		R	1
28	Teak	0.92	5		R	1
29	Teak	0.49	5		R	1
30	Teak	0.51	5		R	1
31	Teak	0.62	5		R	1
32	Banana	2	4	L		10
33	Banana	2	4		R	15
34	Sham khatal	1.38	6		R	1
35	Sajna	0.68	4		R	1
36	Sajna	0.96	4		R	1
37	Sajna	0.28	4		R	1
38	Sonaru	1.95	6		R	1
39	Ajar	0.65	6		R	1
40	Ajar	0.69	6		R	1
41	Jiya	0.75	6		R	1
42	Ajar	0.75	6		R	1
43	Gamari	1.05	6		R	1
44	Bamboo(Jati)		10-14		R	350
45	Bamboo(Jati)		10-14	L		100
46	Jackfruit	0.25	3	L		1
47	Bel	0.28	4	L		1
48	Bel	0.29	4	L		1
49	Sajna	0.5	3	L		20
50	Bamboo(Bijili)			L		100

AP-25 TO AP-26

Some Portion Non Forest, & Some portion Forest, both part Tree marking hold.

AP-26 TO AP-28

Forest

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
			AP-29 TO AP-30			
1	Bamboo(Bijili)		7		R	150
2	Bamboo (Talta)		20		R	200
3	Bamboo(Nal)		10		R	50
4	Tamul	0.4	15	L		60
5	Khujli	1.1	30		R	1
6	Khujli	1.23	25		R	1
7	Khujli	1.9	13	L		1
8	Khujli	1	13	L		1
9	Puma	1.9	30		R	1
10	Tamul	0.5	15		R	60
11	Todoi	0.8	5		R	1
12	Gamari	1.53	20		R	1
13	Modhuri	0.25	4		R	1
14	Coconut	0.7	5		R	1
15	Mango	0.75	5		R	1
16	Mango	0.4	3		R	2
17	Bali Sanda	0.3	2		R	2
18	Neem	0.3	3		R	1
19	Amla	0.3	3		R	1
20	Banana		3		R	6
21	Mango (Chara)				R	1
22	Modhuri Chara				R	2
23	Papaya		3		R	5
24	Litchi Chara		2	L		1
25	Sajna	0.8	2		R	1
26	Chatiana	0.42	2	L		1
27	Chatiana	1.6	5	L		1
28	Unknown	0.3	3	L		1
29	Tamul Chara			L		10
30	Banana		3		R	10
31	Banana		3	L		60
32	Tamul Chara			L		50
33	Bamboo (Talta)		10		R	40
34	Gamari	1	16		R	1
35	Gamari	1	16		R	1
36	Gamari	1	20	L		1
37	Aahat	1.2	6		R	1
38	Gamari	0.55	7		R	30
39	Bamboo (Talta)		10	L		5
40	Teak	0.3	4	L		1
41	Gamari	1	20	L		1
42	Unknown	0.67	5	L		1
43	Gamari	0.8	7	L		1
44	Teak Chara			L		12
45	Shimul	0.8	8		R	5
46	Shimul	0.3	4		R	14
47	Bamboo(Jati)		6		R	15
48	Bamboo(Jati)		6	L		300
49	Shimul	0.9	13		R	2
50	Shimul	0.9	14		R	1
51	Aahat	2.2	13		R	1
52	Shirish	1	3		R	1
53	Unknown	3.2	7		R	1
54	Shimul	0.9	13	L		3
55	Shimul	0.6	7	L		6
56	Shimul	0.3	4	L		8
57	Sajna	1	3	L		2
58	Unknown	0.25	3		R	1



TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
			AP-30 TO AP-31			
1	Sajna	1	3	L		3
2	Houla	3.5	15	L		1
3	Bali Sanda	0.3	3		R	5
4	Krishna Chura	0.4	4	L		1
5	Bali Sanda	0.3	3	L		6
6	Aahat	3.3	13	L		1
7	Krishna Chura	0.4	4		R	1
8	Karamcha	0.3	3		R	2
9	Bali Sanda	0.3	3		R	2
10	Aahat	1	4		R	1
11	Puma	1.2	15		R	1
12	Puma	0.95	6	L		1
13	Khonari	1.1	8	L		2
14	Puma	2.2	13		R	1
15	Puma	1.9	13		R	1
16	Puma	1.1	11	L		1
17	Krishna Chura	0.95	4	L		1
18	Krishna Chura	1.3	13	L		1
19	Krishna Chura	0.98	15	L		1
20	Puma	1.3	13	L		1
21	Koroi	3	14		R	1
22	Krishna Chura	1	16		R	1
23	Puma	1.4	13		R	1
24	Puma	1.5	14		R	1
25	Puma	2	15	L		1
26	Krishna Chura	0.8	7	L		1
27	Puma	1.7	12		R	1
28	Shirish	1.5	6		R	1
29	Madhar	0.6	4		R	2
30	Modhuri	0.3	3		R	1
31	Puma	1.6	12		R	2
32	Shirish	0.9	7		R	1
33	Madla	1	3	L		1
34	Puma	1.2	6		R	1
35	Puma	1.8	20		R	1
36	Puma	1.8	13	L		1
37	Bali Sanda	1	6	L		1
38	Bali Sanda	1.3	10	L		1
39	Bali Sanda	0.9	4	L		1
40	Puma	2.2	13		R	1
41	Puma	2	13	L		1
42	Bali Sanda	0.8	3	L		1
43	Bali Sanda	1.1	7	L		1
44	Koroi	1.1	18	L		1
45	Awa Dumur	3	14	L		1
46	Puma	1.4	13		R	1
47	Bali Sanda	1	5		R	1
48	Nahar	1.9	21		R	1
49	Mango	1	13	L		2
50	Karamcha	0.3	3	L		3
51	Madhar	0.3	3	L		1



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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
AP-31 TO AP-32						
1	Bogori	1.2	6	L		1
2	Koroi	0.5	4	L		1
3	Teak	0.5	8	L		1
4	Sajna	0.8	3		R	13
5	Sajna	0.8	3	L		4
6	Tamul	0.4	10	L		15
7	Teak	1.1	9	L		1
8	Chatiana	0.6	3	L		1
9	Awa Dumur	1.1	13	L		1
10	Teak	0.9	9	L		2
11	Teak	0.99	11	L		3
12	Teak	0.6	5	L		3
13	Puma	1.8	20	L		1
14	Teak Chara			L		6
15	Teak	0.4	4	L		1
16	Jamuk	0.4	4		R	4
17	Bamboo (Talta)		12		R	70
18	Teak	0.95	14		R	1
19	Teak	0.8	12		R	1
20	Teak	0.3	5		R	2
21	Rubber	0.8	10	L		25
22	Rubber	0.8	10		R	25
23	Teak	1.7	16		R	1
24	Rubber	0.5	10		R	11
25	Rubber	0.5	10	L		10
26	Bamboo (Talta)		12		R	400
27	Teak	1.1	20		R	1
AP-32 TO AP-33						
1	Rubber	8	10		R	40
2	Rubber	0.8	10	L		12
3	Rubber	0.5	10		R	6
4	Bamboo(Bijili)	0.5	10	L		3
5	Nimbu		4		R	100
6	Nimbu	0.7	8		R	1
7	Unknown	0.3	3		R	1
8	Madhar	1.7	10	L		1
9	Khujli	0.9	10	L		1
10	Sajna	0.7	3		R	3
AP-33 TO AP-34						
1	Khujli	1.07	4	L		1
2	Khujli	1.52	4	L		1
3	Madla	0.25	2		R	25
4	Tita sopa	0.98	4		R	1
5	Unknown	0.23	4		R	10
6	Jhelik	0.69	4		R	1
7	Bamboo(Jati)		10-12	L		20
8	Teak	0.52	4	L		1
9	Teak	1.23	7	L		1
10	Teak	1.01	7	L		1
11	Tamul		1	L		30
12	Banana		3	L		40
13	Teak	0.48	4		R	1
14	Teak	0.89	7		R	1
15	Teak	0.97	7		R	1
16	Teak	0.92	7		R	1
17	Teak	1.12	8		R	1



TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
18	Teak	0.65	7		R	1
19	Banana		3		R	40
20	Tamul		1		R	40
21	Jhelik	3.8	8		R	1
22	Tamul	0.35	3		R	70
23	Banana		3		R	180
24	Madhar	0.62	4		R	1
25	Teak	0.52	5	L		1
26	Gamari	1.52	8	L		1
27	Modhuri	0.29	5	L		1
28	Teak	0.25	4	L		1
29	Teak	0.26	4	L		1
30	Teak	0.89	6	L		1
31	Teak	1.35	7	L		1
32	Teak	1.25	7	L		1
33	Teak	1.08	7	L		1
34	Jhelik	3.5	8		R	1
35	Aahat	0.65	7		R	1
36	Koroi	0.68	8	L		1
37	Teak	0.25	3	L		4
38	Tamul	0.48	8	L		60
39	Tamul Chara		3	L		40
40	Tamul Chara		3		R	70
41	Banana		4	L		20
42	Koroi	0.25	3	L		2
43	Lalipuma	1.25	8		R	1
44	Teak	1.1	8		R	1
45	Koroi	1.82	15		R	1
46	Kadam	2.02	20		R	1
47	Teak	0.95	7		R	1
48	Teak	0.85	7		R	1
49	Teak	0.72	7		R	1
50	Teak	0.95	7		R	1
51	Gamari	1.52	9	L		1
52	Gamari	1.02	8	L		1
53	Gamari	1.35	8	L		1
54	Gamari	0.95	8	L		1
55	Gamari	0.98	8	L		1
56	Teak	1.35	8	L		1
57	Teak	1.08	8	L		1
58	Teak	1.42	8	L		1
59	Gamari	1.67	9	L		1
60	Karamcha		1	L		1
61	Tamul Chara		1		R	10
62	Bogori	1.32	6	L		10
63	Modhuri	0.25	3	L		1
64	Unknown	0.25	2	L		1
65	Tamul	0.45	8	L		1
66	Banana		3	L		40
67	Bamboo(Jati)		3	L		20
68	Tamul	0.46	8		R	200
69	Sanaru	0.66	7		R	120
70	Banana		3		R	1
71	Bamboo(Jati)		10-12		R	25
72	Bamboo(Jati)		10-12		R	80
73	Karamcha	0.68	5	L		50
74	Gamari	0.61	5	L		1
75	Coconut	0.96	7		R	1
76	Unknown	0.48	4	L		1
77	Aahat	1.48	6		R	1
					R	1



TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
AP-34 TO AP-35						
1	Khajur		3		R	1
2	Mos	2.05	10	L		1
3	Houla	1.8	5	L		1
4	Madla	0.25	2	L		4
5	Sanaru	1.9	3	L		1
6	Madla	0.48	3	L		1
7	Madla	0.38	3	L		1
8	Bali Sanda	1.92	5	L		1
9	Khujli	2.8	6	L		1
10	Unknown	1.6	7		R	1
AP-35 TO AP-36						
1	Bamboo(Jati)		10-12	L		200
2	Ajar	0.95	3	L		1
3	Khonari	0.49	6	L		1
4	Khonari	0.61	6	L		1
5	Teak	0.74	6	L		1
6	Teak	0.69	6	L		1
7	Bali Sanda	1.52	8		R	1
8	Bali Sanda	1.12	8		R	1
9	Bali Sanda	1.23	8		R	1
10	Tita sopa	1.1	8		R	1
11	Khajur		2		R	3
12	Khujli	1.52	6		R	1
13	Aahat	2.5	6		R	1
14	Aahat	2.6	6		R	1
15	Madla	0.25	3		R	4
AP-36 TO AP-37						
1	Karamcha	0.25	2		R	5
2	Dumur	0.48	4		R	1
3	Sham khatal	4.5	15		R	1
4	Unknown	0.65	5		R	1
5	Unknown	0.48	5		R	1
6	Unknown	0.49	5		R	1
AP-37 TO AP-38						
1	Bon Jalpai	3.5	10		R	1
2	Aahat	0.56	4		R	1
3	Bon Jalpai	3.6	15		R	1
AP-38 TO AP-39						
		No Tree				
AP-39 TO AP-40						
		No Tree				



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TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs	HEIGHT Mtrs (APPROX.)	LEFT	RIGHT	NOS
AP-40 TO AP-41						
1	Ajar	0.52	4	L		1
2	Bogori	0.25	3	L		1
3	Bogori	0.28	2	L		1
4	Bogori	0.65	4	L		1
5	Karamcha	0.92	5	L		1
6	Karamcha	0.45	1	L		1
7	Karamcha	0.45	4	L		1
8	Karamcha	0.35	4	L		1
9	Karamcha	0.48	4	L		1
10	Karamcha	0.35	4	L		1
11	Karamcha	0.45	4	L		1
12	Karamcha	0.58	5	L		1
13	Karamcha	0.62	5	L		1
14	Karamcha	0.42	4	L		1
15	Karamcha	0.47	4	L		1
16	Karamcha	0.48	4	L		1
17	Karamcha	0.39	4	L		1
18	Karamcha	0.35	4	L		1
19	Karamcha	0.74	6	L		1
20	Karamcha	0.25	2	L		1
21	Karamcha	0.32	3	L		1
22	Karamcha	0.49	4	L		1
23	Karamcha	0.62	5	L		1
24	Karamcha	0.49	4	L		1
25	Karamcha	0.25	3	L		1
26	Karamcha	0.35	3	L		1
27	Karamcha	0.25	3	L		1
28	Karamcha	0.39	4	L		1
29	Karamcha	0.37	3	L		1
30	Karamcha	0.48	4	L		1
31	Karamcha	0.52	5	L		1
32	Karamcha	0.38	2	L		1
33	Karamcha	0.51	4	L		1
34	Karamcha	0.62	5	L		1
35	Karamcha	0.25	2	L		1
36	Karamcha	0.65	6	L		1
37	Karamcha	0.45	5	L		1
38	Sonaru	0.45	4	L		1
39	Unknown	0.65	5	L		1
40	Karamcha (Chara)		1	L		15
AP-41 TO AP-42						
1	Bogori	0.62	4	L		1
2	Bamboo(Jati)		10-12	L		50
3	Saura	0.49		L		1
4	Dumur	1.52	5	L		1
5	Banana		4	L		10
6	Satiana	1.62	5	L		1
7	Sanaru	0.45	4	L		1
8	Ghora neem	0.65	5		R	1
9	Ghora neem	0.49	5		R	1
10	Ghora neem	0.52	4		R	1
11	Ghora neem	0.38	4		R	1
12	Tamul	0.49	6		R	10
13	Coconut	1.12	15		R	1
14	Mango	0.52	5		R	1
15	Tamul	0.48	6		R	1
16	Tamul Chara		1		R	50
AP-42 TO AP-43						
			No Tree			

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
			AP-43 to AP-44			
1	Litchi Chara	0.12	2	L		20
2	Modhuri Chara	0.25	2	L		10
3	Banana				R	10
4	Litchi	0.23	4		R	15
5	Modhuri Chara	0.29	3		R	10
6	Banana	0.25	3		R	15
7	Sajna	0.59	4		R	1
8	Sajna	0.48	5		R	1
9	Sajna	0.65	5		R	1
10	Sajna	0.49	5		R	1
11	Sajna	0.52	5	L		1
12	Sajna	0.59	5	L		1
13	Sajna	0.88	5	L		1
14	Sajna	0.52	5	L		1
15	Sajna	0.48	5	L		1
16	Sajna	0.49	5	L		1
17	Sajna	0.56	5	L		1
18	Bamboo(Jati)		10-15	L		120
19	Bamboo(Jati)		10-15		R	150
20	Puma	0.45	4		R	1
21	Puma	0.49	4		R	1
22	Puma	0.68	4	L		1
23	Puma	0.38	4	L		1
24	Puma	0.26	4	L		1
25	Puma	0.28	4	L		1
26	Otanga	0.45	4	L		1
27	Gamari	0.49	5	L		1
28	Gamari	0.35	5	L		1
29	Gamari	0.48	5	L		1
30	Gamari	0.49	5	L		1
31	Tamul	0.52	7		R	40
32	Tamul	0.51	7	L		45
33	Tamul	0.38	4	L		60
34	Tamul	0.38	4		R	80
35	Gamari	0.68	6		R	1
36	Gamari	0.45	6	L		1
37	Gamari	0.48	6		R	1
38	Gamari	0.49	6	L		1
39	Teak	0.61	7		R	1
40	Teak	0.69	7		R	1
41	Unknown	0.48	7	L		1
42	Unknown	0.74	7	L		1

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs. (APPROX.)	LEFT	RIGHT	NOS
AP-44 to AP-45						
1	Tamul	0.49	8		R	40
2	Tamul	0.45	3		R	25
3	Karamcha	0.43	4		R	1
4	Karamcha	0.48	4		R	1
5	Karamcha	0.47	4		R	1
6	Karamcha	0.35	4		R	1
7	Karamcha	0.48	4		R	1
8	Tamul	0.38	6	L		20
9	Tamul	0.49	2	L		15
10	Sajna	0.48	4		R	1
11	Sajna	0.52	4		R	1
12	Velco	0.62	5	L		1
13	Banana		4		R	10
14	Khujli	1.52	4		R	1
15	Unknown	1.25	4		R	1
16	Houla	1.78	4		R	1
17	Houla	1.98	5		R	1
18	Houla	1.12	6		R	1
19	Bamboo(Jati)		10-12		R	40
20	Hatikunia	1.95	7		R	1
21	Houla	1.78	7		R	1
22	Houla	1.68	6		R	1
23	Houla	1.98	7		R	1
24	Unknown	1.25	6	L		1
25	Bamboo(Jati)		10-12	L		300
26	Bel	0.95	6	L		1
AP-45 to AP-46						
1	Unknown	0.95	4	L		1
AP-46 to AP-47						
1	Shirish	2.95	6	L		1
2	Sonaru	0.81	4	L		1
3	Sonaru	0.21	2	L		1
4	Sonaru	0.18	2	L		1
5	Shirish	0.5	4		R	1
AP-47 to AP-48						
		No Tree				
AP-48 to AP-49						
		No Tree				
AP-49 to AP-50						
1	Kadam	0.85	8	L		1
2	Kadam	0.5	8	L		1
3	Kadam	0.87	9	L		1
4	Kadam	0.86	9	L		1
5	Kadam	0.8	9	L		1
AP-50 to AP-51						
1	Kadam	1.2	7		R	1
2	Kadam	1.23	7	L		1
3	Kadam	1	2	L		1
AP-51 to AP-52						
		No Tree				



Page 16 of 17

TREE ENUMERATION 400KV SHILCHAR TO BYRNIHAT LILO AT SONAPUR TL.

SL NO	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT Mtrs (APPROX)	LEFT	RIGHT	NOS
AP-52 to AP-53						
1	Puma	0.62	6	L		1
2	Karamcha	0.61	14	L		1
3	Karamcha	0.51	5	L		1
4	Bamboo(Jati)				R	90
5	Banana		4		R	7
6	Mango	1.23	4	L		1
7	Satiana	1.23	4		R	1
8	Satiana	0.65	4		R	1
9	Karamcha	0.23	2		R	1
10	Karamcha	0.23	2		R	1
11	Karamcha	0.25	2		R	1
12	Karamcha	0.26	2		R	1
13	Kherish	0.25	5	L		1
14	Puma	0.29	3	L		1
15	Shirish	0.45	4	L		1
16	Koroi	0.38	3	L		1
17	Koroi	0.23	3	L		1
18	Shirish	0.52	4	L		1
19	Shimul	0.41	6		R	1
AP-53 to AP-54						
		No Tree				
AP-54 to AP-55						
		No Tree				
AP-55 to AP-56						
		No Tree				
AP-56 to AP-57						
		No Tree				
AP-57 to AP-58						
1	Sonaru	1.2	4		R	2
2	Unknown	0.25	2		R	2
3	Tamul	0.1	1	L		20
AP-58 to AP-59						
		No Tree				
AP-59 to AP-60						
		No Tree				
AP-60 to AP-61						
1	Shimul	0.65	4	L		1
AP-61 to BAY						
		No Tree				



Page 17 of 17

APPENDIX 14: PHOTOGRAPHS AND ATTENDANCE SHEET OF CONSULTATION WITH SONAPUR RANGE OFFICE AND LOCAL PUBLIC

Consultation with Range Office





Consultation with Public



AP- 3 to 5



AP- 25 to 27

FEEDBACK
Making Infrastructure Happen

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet

Venue: Office of the Forest Range Officer, SONAPUR Date: 16.12.2025

Purpose: Discussion with forest Deptt. officials with respect to West Aprikola Reserved Forest for 400KV S/C LILO at Sonapur GIS from 400KV Silchar-Byrnihat Line

SL. No.	Name	Designation	Contact No.	Signature
1	Jayanta Kr Medhi	Deptt. Ranger	9864284702	16/12/2025
2	Pranjit Deka	Forester (1)	9101129010	16/12/2025
3	Deep Kalita	Forester (1)	9101348062	
4	Parthajit Baishya	Comm. Coun. Officer	9699945532	
5	Khanin Baishya	Social Expert PMC, BEGLL	9864223185	
6	Bijit Borah	Environment Engineer, PMC	7002852186	

FEEDBACK
Making Infrastructure Happen

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet for Public Consultation

Venue: Towers location No - AP-3 to AP-8 Date: 16/12/2025

SL. No.	Name	Sex	Occupation	Signature
1	Gopal Rangpi	M	Shopkeeper	
2	Raj Ingti	M	Farmer	
3	Sunil Phangso	M	Farmer	
4	Khanin Baishya	M	Social Expert PMC, BEGLL	
5	Bijit Borah	M	Environment Engineer, PMC	
6	Parthajit Baishya	M	Comm. Consultation Officer, TEECL	

APPENDIX 15: PHOTOGRAPHS AND ATTENDANCE SHEET OF CONSULTATION WITH TRIBAL PEOPLE





PT FEEDBACK

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet for Tribal People Consultation

Name of Contractor: Techno Electric & Engineering Company Limited

Date: ...12...12...2025.....

SL.NO	NAME	SEX	SC/ST	OCCUPATION	SIGNATURE
1	Ashok Lalung	M	ST	Farmer	Ashok Lalung
2	Bhibin Engti	M	ST	Farmer	BENGTI
3	Pankeswar Lohar	M	ST	Businessman	Lohar. T
4	Monjai Lalung	M	ST	Farmer	Monjai Lalung
5	Ranjit lalung	M	ST	Farmer	Ranjit lalung
6	Tarun Garo	M	ST	Farmer	Tarun Garo
7	Bikash Lalung	M	ST	Farmer	Bikash Lalung
8	Nadir Patar	M	ST	Farmer	Nadir
9	Nirmal Kathar	M	ST	Farmer	নির্মল
10	Paresh Boodoloi	M	ST	Private Service	P Boodoloi
11	Prafulla Lalung	M	ST	Farmer	Prafulla Lalung
12					

APPENDIX 16: COPY OF THE IN-PRINCIPLE APPROVAL (STAGE-I FOREST CLEARANCE) OF THE CENTRAL GOVERNMENT

भारत सरकार
Government of India
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
क्षेत्रीय कार्यालय, शिलांग/Regional Office, Shillong
उप कार्यालय, गुवाहाटी/Sub - office, Guwahati
चौथी मंजिल, हौसेफेड इमारत, जी एस रोड , रुक्मणी गाँव, गुवाहाटी- ७८१०२२
4th Floor, Housefed building, GS Road, Rukmini gaon, Guwahati -781022
दूरभाष /Tel Fax: 0361-2962350, E-mail: iro.guwahati-mefcc@gov.in

F.No.3 AS C 188/2023/GHY/5155-56 30th January, 2024

सेवा मे,
अतिरिक्त प्रमुख सचिव/ Addl. Chief Secretary,
असम सरकार/Govt of Assam,
पर्यावरण और वन विभाग/Environment and Forests Department,
दिसपुर/Dispur, गुवाहाटी/Guwahati-781006.

Sub: Proposal for diversion of 14.28 ha of forest land for construction of 400 KV S/C LILO Silchar Byrnihat Transmission line in West Aprikola Reserve Forest under Kamrup East Division Basistha in favour of AEGCL.

Sir,

This has got reference to the online proposal FP/AS/TRANS/411353/2022 and State Govt letter eCF No.381903/38 dated 07.12.2023 on the subject seeking prior approval for the Central Government under Section 2 of the FCA, 1980 and to say that the proposal has been examined by the Regional Empowered Committee constituted by Central Government under Section 3 of aforesaid Act.

2. After careful examination of the proposal of the State Govt and on the basis of the recommendations of Regional Empowered Committee on 19.12.2023 and State Govt letter eCF No.381903/38 dated 07.12.2023, "**In Principle Approval/Stage- I**" clearance of the Central Government is hereby granted for diversion of 14.28 ha of forest land for construction of 400 KV S/C LILO Silchar Byrnihat Transmission line in West Aprikola Reserve Forest under Kamrup East Division Basistha in favour of AEGCL subject to the following conditions:

A. Conditions which need to be complied prior to handing over of forest land by the State Forest Department.

(1) The user agency shall transfer, the Net Present Value (NPV) **along with the revised rates of NPV** of the forest land being diverted under this proposal, as per the orders of the Hon'ble Supreme Court of India dated 28/03/2008, 24/04/2008 and 09/05/2008 in Writ petition (Civil) No. 202/1995 and as per the guidelines issued by the Ministry vide letters No 5-3/2007-FC dated 05.02.2009 and **File No.5-3/2011-FC(Vol-I) dated 21.03.2022**. The requisite funds shall be transferred through online portal into CAMPA account of the State concerned.

(2) The user agency shall transfer the cost of raising and maintaining the compensatory afforestation at the current wage rate in consultation with State Forest Department in the account of CAMPA of the concerned State through online portal. The scheme may

include appropriate for anticipated cost increase for works scheduled for subsequent years;

(3) All the funds received from the user agency (CA and dwarf plantation cost, NPV, etc) under the project shall be transferred/ deposited to Compensatory Afforestation Fund of Assam State managed by the Ad-hoc CAMPA only through ***e-portal*** *(https://parivesh.nic.in/).* Amount deposited through other mode will not be accepted as compliance of the Stage-I clearance.

(4) The KML files of the area to be diverted, the CA areas, the proposed SMC work, the proposed Catchment Area Treatment area and the WLMP area shall be uploaded on the e-Green watch portal with all requisite details before issuing working permission towards linear projects or submitting compliance report for seeking Stage II approval, as the case may be.

(5) The boundary of the diverted forest land shall be suitably demarcated on ground at the project cost, as per the directions of the concerned Divisional Forest Officer;

(6) The user agency shall explore the possibility of successful translocation of maximum number of trees identified to be felled and shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

(7) The charges for felling, logging and transportation of project affected trees should be collected from the User Agency at the rates approved by the State Govt and deposited with the DFO concerned for utilization immediately following the diversion of forest land;

(8) The expenditure like boundary walls, stone pillars, demarcation charges, cost of damage of trees the funds on these accounts should, be deposited with the DFO concerned;

(9) The User Agency shall restrict the felling of trees to minimum number in the diverted forest land and the trees shall be felled under the strict supervision of the State Forest Department and the cost of felling of trees shall be deposited by the User Agency with the State Forest Department;

(10) The complete compliance of the FRA, 2006 shall be ensured by way of prescribed certificate from the concerned District Collector;

(11) Violation of any of these conditions will amount to violation of Forest (Conservation) Act, 1980 and action would be taken as prescribed in Consolidated Guidelines And Clarifications issued Under Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 And Van (Sanrakshan Evam Samvardhan) Rules, 2023 issued by this Ministry.

(12) The User Agency in consultation with the State Forest Department prepare a detailed scheme for creation and maintenance of plantation of dwarf species (preferably medicinal plants) in right of way under the transmission line for execution of the said scheme to the State Forest Department;

(13) The compliance report shall be uploaded on ***e-portal*** *(https://parivesh.nic.in/).*

B: Conditions which need to be strictly complied on field after handing over of forest land to the user agency by the State Forest Department but the compliance in form of undertaking shall be submitted prior to Stage-II approval:

(1) Legal status of the forest land shall remain unchanged.

(2) The compensatory afforestation shall be taken up on double the degraded forest land of 30.30 ha of double the degraded forest land at Dhemainc Village, Sonapur Range in Kamrup Metropolitan District within three years from the date of Stage –II Clearance and maintained thereafter by the State Forest Department at the cost of the User Agency. As far as possible, a mixture of local indigenous species shall be planted and monoculture of any species may be avoided. The CA will be maintained for 10 years.

(3) At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(4) The User Agency shall obtain the Environment Clearance as per the provisions of Environment (Protection) Act, 1986, if required;

(5) No labour camp shall be established on the forest land and the User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(6) The forest land proposed to be diverted shall under no circumstances be transferred to any other agencies, department or person without prior approval of Govt. of India.

(7) No damage to the flora and fauna of the adjoining area shall be caused;

(8) The lay out of the proposal shall not be changed without the prior approval of the Central Government.

(9) The concerned Divisional Forest Officer, will monitor and take necessary mitigative measures to ensure that there is no adverse impact on the forests in the surrounding area.

(10) The User Agency at its cost shall provide bird deflectors, which are to be fixed on upper conductor of transmission line at suitable intervals to avoid bird hits.

(11) The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project.

(12) The User Agency shall comply with the guidelines for laying transmission through forest areas issued by Ministry vide letter no. 7-25/2012-FC dated 05/05/2014 & 19/11/2014.

(13) No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work.

(14) The period of diversion under this approval shall be co-terminus with the period of lease to be granted in favour of the user agency or the project life, whichever is less.

(15) The forest land shall not be used for any purpose other than that specified in the project proposal.

(16) As per Ministry's letter No 11-30/96-FC(Pt) dt 14.9.2001, if the compliance of stipulated conditions is awaited from the State Govt for more than 5(five) years, the in-

principle approval would be summarily revoked considering that the user agency is no longer interested in the project.

(17) Any other conditions that the Regional Office, Shillong, Ministry of Environment, Forest & Climate Change may stipulate from time to time in the interest of conservation, protection and development of forests & wildlife.

3. After the receipt of the compliance report from the State Government on fulfillment of the conditions mentioned above, final/stage-II approval of the Central Government, in accordance with Section 2 of the Forest (Conservation) Act, 1980, will be considered. Till the receipt of the Final / Stage-II approval of the Central Government for diversion of the said forest land from this Ministry, transfer of the said forest land to the User Agency shall not be affected by the State Government.

भवदीय,

(W. I. Yatbon)
वन उप महानिरीक्षक (केंद्रीय)
Deputy Inspector General of Forests(C)

Copy to:
The Principal Chief Conservator of Forests & HoFF, Govt of Assam, Environment and Forest Department, Aranya Bhawan, Rop Konwar Jyoti Prasad, Agarwal Path, Near Srimanta Sankardev Kalakhetra, Panjabari, Guwahati-781037.

वन उप महानिरीक्षक (केंद्रीय)
Deputy Inspector General of Forests(C)

o/c

APPENDIX 17: COPY OF CAMPA PAYMENT CONFIRMATION

Gmail E&S AEGCL <es.aegcl.pmu@gmail.com>

Fwd: CAMPA Payment Confirmation

AGM GSS Kahilipara AEGCL <agm.kahilipara@aegcl.co.in> 11 March 2024 at 13:36
To: PD AIIB <pd.aiib@aegcl.co.in>, E&S AEGCL <es.aegcl.pmu@gmail.com>

From: monitoring-ec@nic.in
To: "AGM GSS Kahilipara AEGCL" <agm.kahilipara@aegcl.co.in>
Sent: Monday, March 11, 2024 12:52:37 AM
Subject: CAMPA Payment Confirmation

moefcc

Government of India
Ministry of Environment Forest and Climate Change
Centralized Processing Centre - Green

It is to inform you that the payment of the proposal with the details given below has been successfully completed Form-A (Part-I): Diversion of Forest Land:

i)	proposal For	Form-A (Part-I): Diversion of Forest Land
ii)	Proposal No.	FP/AS/TRANS/411353/2022
iii)	Name of the Project	Construction of 400 KV S/C LILO Silchar Byrnihat Transmission line under Assam Intra-State Transmission System Enhancement Project
iv)	Name of the User Agency	ASSAM ELECTRICITY GRID CORPORATION LIMITED
v)	Forest Land Proposed for Diversion	14.28 Ha.
vi)	Approval Granting Authority	State Secretary (SS)
vii)	Location of Project	KAMRUP METRO - ASSAM
viii)	Category of Proposal	TRANS
ix)	Status of Application	Pending at UA for Levies Payment
x)	Transaction ID/ UTR	SBINR52024030707294040955968
xi)	Cheque or DD Number	SBINR52024030707294040955968
xii)	Date of Transaction	07/03/2024
xiii)	Amount Paid	53475093
xiv)	Bank Name	Union Bank of India
xv)	Branch Name	Union Bank of India- FCS Centre Bangalore-21 Mission 3rd Floor Jellitta Tower- Bangalore -560027
xvi)	Account Name	150617299
xvii)	Mode of Payment	NEFT/RTGS

Date: 11/03/2024

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APPENDIX 18: ECOLOGICAL IMPACT ASSESSMENT OF PROPOSED TRANSMISSION LINE WITH RESPECT TO NEAREST PROTECTED AREA

Objective:

As a part of Environmental due diligence of the sub-project activities, an ecological assessment has been carried out for the proposed *"400 KV S/C Lilo at Sonapur GIS from 400 kV Silchar-Byrnihat Line*" which involves forest area (i.e., 14.28 Ha forest land in West Aprikola Reserved Forest) and also considering the nearest Protected area i.e., Amchang Wildlife Sanctuary situated at a distance of 5.22 KM from the proposed T/L route. The objective is to assess the impacts on biodiversity of the aforesaid areas, if any, from the proposed project activities and suggest mitigation measures as per site condition for implementation by Project proponent.

Description of the Eco-sensitive area:

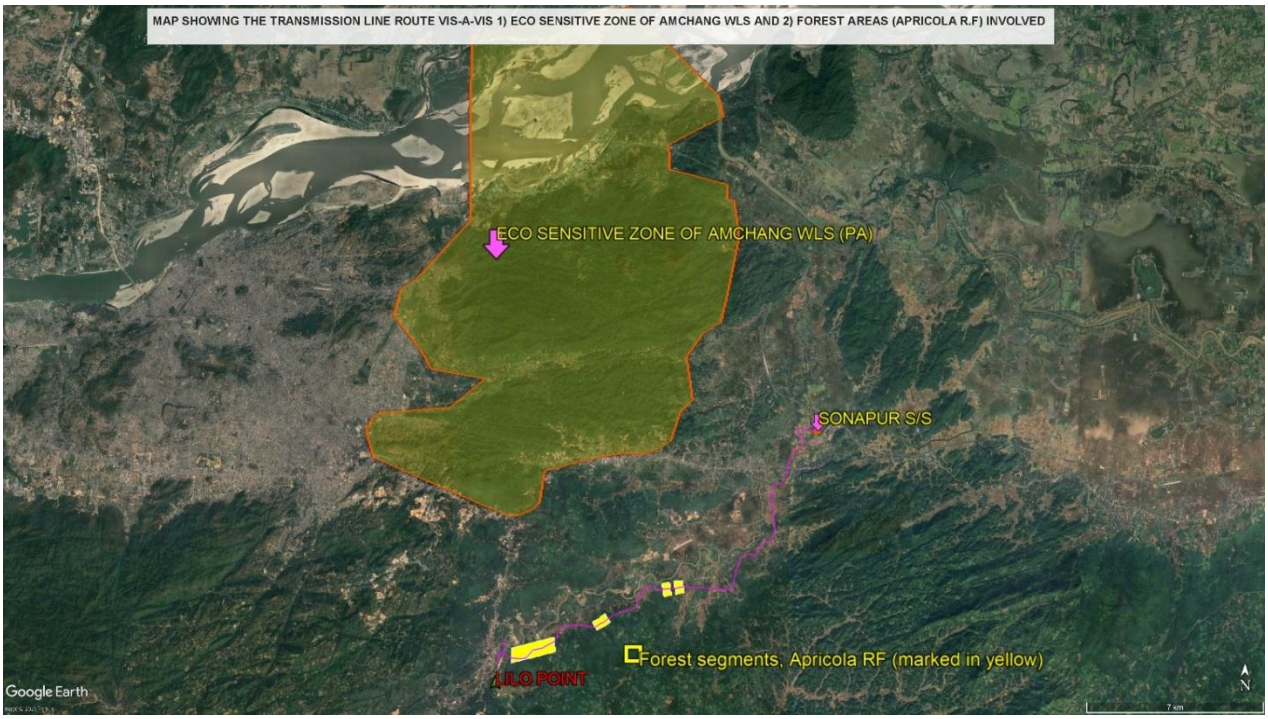
The Amchang Wildlife Sanctuary situated in Kamrup District of State of Assam consists of Amchang Reserve Forest, South Amchang Reserve Forest and Khanapara Reserve Forest and located within the geographical limits of 26°13'N to 26°06' N latitude and 91°50' E to 91°58' longitude and is spread over an area of 78.64 square KM. A major portion of the sanctuary is undulating and covered by hillocks which form a unique geomorphologic feature with unique wildlife habitat and the Sanctuary represents one of the rich and ecologically diverse habitats for the wide variety of animals and plant species. Hollock gibbon, Chinese pangolin, Flying squirrel, Assamese Macaque, Capped languor, Slow loris, Leopard, Elephant, Sambar, Barking Deer, Gaur etc., are the principal animals found in the wildlife sanctuary. In addition to these a wide variety of avian fauna, reptiles, amphibians and insects are found in the wildlife sanctuary. The sanctuary is located on the eastern limit of Guwahati city and the increase in biotic pressure in the fringe areas can affect the habitat of the sanctuary;

In order to conserve and protect the area, specific zone around the Amchang Wildlife Sanctuary has already been declared as **Eco-sensitive Zone (ESZ)** from ecological and environmental point of view and to prohibit industries or class of industries and their operations and processes in the said Eco-sensitive Zone. *A copy of the ESZ notification of Amchang WLS is enclosed herewith*.

The West Aprikola Reserved Forest is a protected forest area located in the Kamrup East Division of near the Assam-Meghalaya border. The topography is described as hilly terrain with undulating, red soil and fertile land. It is part of the broader forest ecosystem in Assam. Local villagers from areas such as Topatoli, Madhupur, and others have historically been granted privileges for domestic consumption of firewood from the forest, subject to specific limits. The forest has been the site of proposals for infrastructure development including the construction of a natural gas pipeline and a 132 KV transmission line which required forest clearances from the government.

Impact Assessment

A map showing the proposed transmission line route vis-à-vis the Eco Sensitive Zone of Amchang Wildlife Sanctuary is prepared and placed below:



Siting Distance and impacts:

As evident from the map proximity analysis, the proposed transmission line is at a very safe siting distance from the ESZ boundary of the Amchang WLS. Also as per the report of DFO, the distance from the ESZ boundary 5.22 KM and as such the direct impact on the biodiversity of core sanctuary and the immediate ESZ area is assessed to be negligible.

Also, the proposed T/L route does not involve any critical wildlife habitat area and as per site assessment only common domestic animals are prevalent in the project area except few wild species like fox and monkeys. In respect of forest areas involved in the West Aprikola RF (i.e.,14.28 Ha) during consultation with the Forest Range Officer, Sonapur, it was confirmed that the proposed transmission line does not pass through or affect any critically designated wildlife habitats within the Reserved Forest area. However, the presence of common wildlife species such as monkeys and foxes was reported.

Further consultations were carried out with local people residing near the reserved forest at AP 3 to 5 and AP 24 to 27. The local residents informed that no wild animals have been observed in the area except for foxes, since they started residing in the villages.

Photographs and attendance sheets of the consultations are enclosed in Appendix-14. A map showing the project area vis-à-vis the locations of Critical Wildlife Habitats (KBA sites) are presented in Figure-4.3."

- **Construction Phase:** Impacts during the construction phase which involves tower foundation, erection and stringing are primarily temporary and localized, including potential noise, dust, and minor soil disturbance.
- **Operation Phase:** During the operation phase, the potential impacts are bird collisions, which may cause harm to the different bird species of Amchang WLS/IBA. Necessary mitigation measures to

avoid/minimise bird collision are provided in table 6.7 and table 10.2. Further sufficient vertical clearance available below the transmission line, there will be no impact on the free movement of animals in the project area.

Mitigation Measures

- **Minimize Disturbances: All construction activities will be managed to minimize noise and dust levels to avoid disturbing local wildlife.**
- **Waste Management: Proper solid waste management and disposal protocols will be established for the construction camps.**
- **Movement of Animals and birds: The construction of transmission line in forest area will adhere to the MoEF guideline as stipulated in the Forest Clearance conditions of the project. Also sufficient vertical clearance *(8.84 Mtr for 400 kV line)* for the T/L will be ensured not impede the movement of animals as mentioned. Also installation of bird diverters will be ensured as per the guideline of MoEF.**

- **Copy of In-Principle Forest Clearance issued by MoEF, Shillong is enclosed in Appendix-16 for reference.**
  - Monitoring and Reporting: A compliance report on the conditions of Forest Clearance is required to be submitted to the MoEF by the Project Proponent.

Inter-alia, some of the mitigation measures proposed by MoEF in the Forest Clearance conditions are stated below:

"Conditions which need to be strictly complied on field after handing over of forest land to the User Agency by the State Forest Department."

1. **Legal status of the forest land shall remain unchanged.**
2. **The compensatory afforestation shall be taken up on double the degraded forest land of 30.30 ha of double the degraded forest land at Dhemainc Village, Sonapur Range in Kamrup Metropolitan District within three years from the date of Stage -1. Clearance and maintained thereafter by the State Forest Department at the cost of the User Agency. As far as possible, a mixture of local indigenous species shall be planted and monoculture of any species may be avoided. The CA will be maintained for 10 years.**
3. **No labour camp shall be established on the forest land and the User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas,**
4. **The forest land proposed to be diverted shall under no circumstances be transferred to any other agencies, department or person without prior approval of Govt. of India.**
5. **No damage to the flora and fauna of the adjoining area shall be caused;**
6. **The lay out of the proposal shall not be changed without the prior approval of the Central Government.**
7. **The concerned Divisional Forest Officer, will monitor and take necessary mitigative measures to ensure that there is no adverse impact on the forests in the surrounding area.**

8. **The User Agency at its cost shall provide bird deflectors, which are to be fixed on upper conductor of transmission line at suitable intervals to avoid bird hits**
9. **The user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and NGT Order (s) pertaining to this project, if any, for the time being in force, as applicable to the project**
10. **The User Agency shall comply with the guidelines for laying transmission through forest areas issued by Ministry vide. letter no. 7-25/2012-FC dated 05/05/2014 & 19/11/2014.**
11. **No additional or new path will be constructed inside the forest area for transportation of construction materials for execution of the project work**
12. **The period of diversion under this approval shall be co-terminus with the period of lease to be granted in favour of the user agency or the project life, whichever is less.**
13. **The forest land shall not be used for any purpose other than that specified in the project proposal**
14. **Any other conditions that the Regional Office, Shillong, Ministry of Environment, Forest & Climate Change may stipulate from time to time in the interest of conservation, protection and development of forests & wildlife.**

APPENDIX 19: USE OF INTEGRATED BIODIVERSITY ASSESSMENT TOOL (IBAT) FOR THE PROPOSED TRANSMISSION LINE

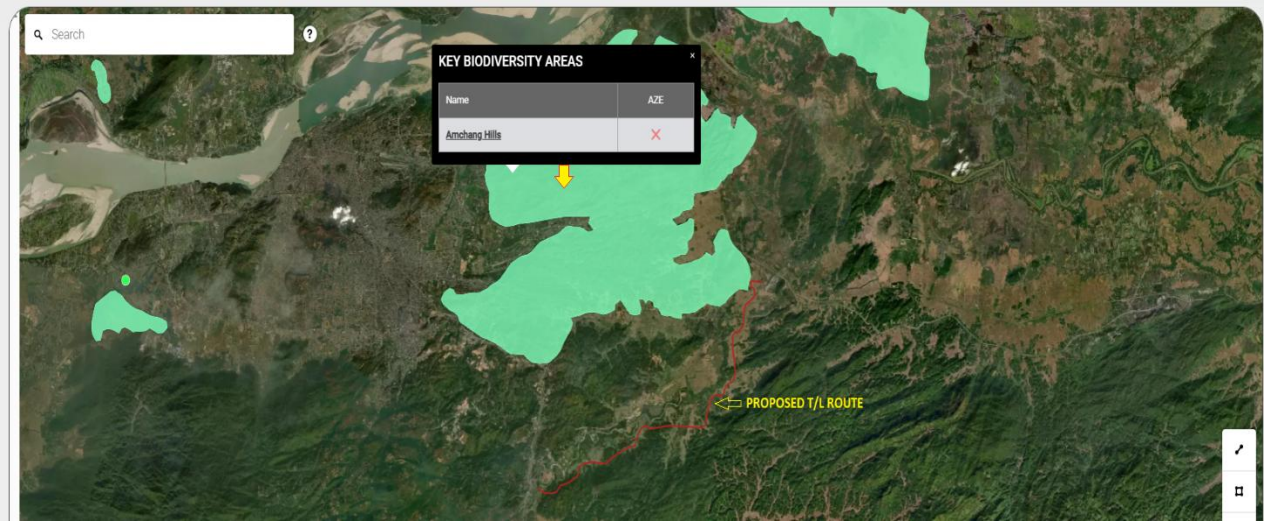
Objective

The primary objective of this analysis is to conduct a biodiversity screening of the proposed transmission line (T/L) route using the Integrated Biodiversity Assessment Tool (IBAT). This study aims to 1) Identify Protected Areas: Locate and assess the proximity of the T/L route to legally protected areas (e.g., Wildlife Sanctuaries, National Parks) and Key Biodiversity Areas (KBAs). The biodiversity database used by IBAT is the same as the *"World Database on Key Biodiversity areas"*. IBAT analysis helps identify, map, monitor and conserve these areas, ensuring they remain safe for future generations. 2) Determine Spatial Risk: Perform a proximity (buffer) analysis to identify where the project's "Area of Influence" i.e., the Right of Way overlaps with ecologically sensitive zones. 3) Assess Biodiversity Sensitivity: Evaluate the potential presence of IUCN Red List threatened species within the corridor to implement the "Mitigation Hierarchy" (Avoidance, Minimization, and Mitigation).

Impact Assessment & Safeguard Measures

The potential impact of Transmission Line (Operation phase) on avian species is collision and electrocution, for which necessary safeguard measures have been provided in table 6.7 and 10.2.

Maps of the proposed transmission line route vis-à-vis the "Key Biodiversity Areas" generated by using the IBAT tool is provided below:



IBAT analysis indicates that the proposed project falls outside the Key Biodiversity Area (KBA) i.e the Amchang Wildlife Sanctuary. The nearest point of the proposed project from the KBA is Sonapur Substation, which is 800 mtrs away from the boundary of KBA (Amchang Wildlife Sanctuary).

However, site assessments confirm the route does not intersect any critical wildlife habitats. Observed fauna in the project area consists primarily of domestic animals and common local wild animals (e.g., foxes and monkeys). Given the lack of direct encroachment of the project on the KBA site the biodiversity impact is assessed as minimal. The proposed mitigation measures as stated earlier are deemed sufficient to ensure ecological safeguard compliance during project implementation.

APPENDIX 20: Indigenous People Impacts Screening Checklist

- **Screening Questions for Indigenous People Impact**

KEY CONCERNS (Please provide elaborations in the "Remarks" column)	Yes	No	Not Known	Remarks
A. Indigenous Peoples Identification				
1. Are there sociocultural groups present in or using the project area who may be considered "tribes" (hill tribes, scheduled tribes, tribal peoples), "minorities" (ethnic or national minorities), or "indigenous communities"?				
2. Are there national or local laws or policies as well as anthropological researches/studies that consider these groups present in or using the project area as belonging to "ethnic minorities, "scheduled tribes, tribal peoples, national minorities, or cultural communities?				
3. Do such groups self-identify as being part of a distinct social and cultural group?				
4. Do such groups maintain collective attachments to distinct habitats or ancestral territories and/or to the natural resources in these habitats and territories?				
5. Do such groups maintain cultural, economic, social, and political institutions distinct from the dominant society and culture?				
6. Do such groups speak a distinct language or dialect?				
7. Have such groups been historically, socially, and economically marginalized, disempowered, excluded, and/or discriminated against?				
8. Are such groups represented as "indigenous peoples," "ethnic minorities," "scheduled tribes," or "tribal populations" in any formal decision- making bodies at the national or local levels?				
B. Identification of Potential Impacts				
9. Will the project directly or indirectly benefit or target indigenous peoples?				
10. Will the project directly or indirectly affect indigenous peoples' traditional sociocultural and belief practices (e.g., child-rearing, health, education, arts, and governance)?				
11. Will the project affect the livelihood systems of indigenous peoples (e.g., food production system, natural resource management, crafts and trade, employment status)?				
12. Will the project be in an area (land or territory) occupied, owned, or used by indigenous peoples, and/or claimed as ancestral domain?				
C. Identification of Special Requirements *Will the project activities include?*				
13. Commercial development of the cultural resources and knowledge of indigenous peoples?				
14. Physical displacement from traditional or customary lands?				
15. Commercial development of natural resources (such as minerals, hydrocarbons, forests, water, hunting or fishing grounds) within customary lands under use that would impact the livelihoods or the cultural, ceremonial, and spiritual uses that define the identity and community of indigenous peoples?				
16. Establishing legal recognition of rights to lands and territories that are traditionally owned or customarily used, occupied, or claimed by indigenous peoples?				

KEY CONCERNS (Please provide elaborations in the "Remarks" column)	Yes	No	Not Known	Remarks
17. Acquisition of lands that are traditionally owned or customarily used, occupied, or claimed by indigenous peoples?				