ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT - ENVIRONMENT AND SOCIAL MANAGEMENT PLAN REPORT FOR TRANSMISSION LINES OF PACKAGE -D (KHUMTAI)

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

SUBMITTED TO

ASIAN INFRASTRUCTURE INVESTMENT BANK

SUBMITTED BY

ASSAM ELECTRICITY GRID CORPORATION LIMITED

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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 and Natural Resources
Km	Kilometre
LC	Least Concern
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 SUMARRY

Background: Asian Infrastructure Investment Bank (AIIB), through Government of India (GOI), has been requested by Government of Assam (GoA) for financial and technical assistance to upgrade and strengthen the power transmission network in the state of Assam to support the implementation of Power for All (PFA) plan. AIIB has considered supporting enhancement of power transmission to improve the reliability of power supply through "Assam Intra-State Transmission System Enhancement Project" (AISTSEP) in two phases.

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 equipments at substations.

As part of AIIB's E&S policy 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.

Description of the Project: The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA - ESMP) report focuses on the three numbers of Transmission Lines namely:

A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km,
B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line – 10.198 km,
C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km.

The project scope involves construction of associated transmission lines.

A brief on activities under taken during construction phase are:

- Pre-construction Activity including 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)
- Clearing of Towering Sites
- Foundations for Towers
- Erection of Towers
- Stringing
- Protection of Tower Footing (if required)
- Final checking
- Testing and Commissioning

A brief on activities under taken during Operation phase are:

- Ground inspection by lineman / team
- Inspection of Towers
- Thermo-vision scanning
- Punctured insulator detection
- Attending all Defects

The above-mentioned Transmission Line corridors are located in the Tehsil Khumtai, Sarupathar, Golaghat and Morongi in the District of Golaghat, State of Assam.

Approx. 60 (3 gangs with 20 persons in each ganag) numbers of labour will be engaged by the contractor during construction period.

The land requirement for the transmission lines is comprised primarily of the following:

- Land required for the 35 numbers of transmission line towers for 220kV LILO Samaguri - Mariani Transmission Line, 33 numbers of transmission line towers for Jorhat to West Bokakhat transmission line and 200 numbers of transmission line towers for Khumtai to Sarupathar.
- The RoW corridor for the 220kV LILO of Samaguri - Mariani transmission line will be 35 m (17.5 m on each side of the transmission line route) for the length of 10.167 km and will cover approx. 355845 sq. m of land i.e. 35.5845 hectare.
- The RoW corridor for Jorhat to West Bokakhat transmission line route is 27 m (13.5 m on each side of the transmission line route) for the length of 10.198 km will cover approx. 275346 sq.m of land i.e. 27.54 hectare.
- The RoW for the Khumtai - Sarupathar transmission line route is 27 m (13.5 m on each side of the transmission line route) for the length of 61.205 km. The RoW corridor for the Khumtai to Sarupathar transmission line will cover approx. 1652535 sq.m of land i.e 165.25 hectare.
- The land for the 220kV LILO of Samaguri - Mariani transmission line tower base is comprised of land from five villages namely Helochi gaon, Khumtai- Nagaon, Leteku Chapori, Gandhi Gaon and Khumtai. The base area for the transmission line towers for DA type towers is approx. 35 to 51 sqm., DB type towers is approx. 47 to 66 sqm., DC type towers is approx. 50 to 70 sqm. and DD type towers is approx. 57 to 79 sqm.
- The land for the 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C

Line tower base is comprised of land from four villages, namely Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai. The base area for the transmission line towers for DA type towers 31 to 45 sqm, DB type towers 37 to 53 sqm, DC type towers 41 to 61 sqm and DD type towers 47 to 70 sqm.

- The land for the 132 kV Khumtai to Sarupathar transmission line tower base is comprised of land from 31 villages, namely Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai.
- The ground area for the Khumtai - Sarupathar transmission line towers for DA type towers 31 to 45 sqm, DB type towers 37 to 53 sqm, DC type towers 41 to 61 sqm and DD type towers 47 to 70 sqm.

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.

Cost of the project is as under:

A. Cost of 220kV D/C SAMAGURI-MARIANI CKT I LILO Transmission Line
Supply Portion – Rs. 75011693.91
Erection Portion – Rs. 33660698.38

B. Cost of 132kV D/C JORHAT WEST- BOKAKHAT LILO Transmission Line
Supply Portion – Rs. 68396174.12
Erection Portion – Rs. 39306565.59

C. Cost of 132kV D/C Khumtai – Sarupathar Transmission Line
Supply Portion – Rs. 270467113.72
Erection Portion – Rs. 130429254.77

NRL is executing a major expansion project of capacity augmentation from present 3.0 MMTPA to. 9.0 MMTPA by installing a 6 MMTPA capacity. For uninterupted and reliable power supply, NRL is presently constructing a 220kV/132 S/s within the NRL campus. To connect this S/s from the AEGCL grid, 2 nos. 220kV cable line is being constructed by NRL which shall be connected to AEGCL Khumtai S/s.

Khumtai S/s which is presently under construction, shall connected to the 220kV grid S/s of AEGCL at Mariani and Samaguri and also connect 132kV Sarupathar S/s and 132kV Bokakhat S/s.

Apart from the above Extra High Voltage (EHV) line, to cater the power demand of the vicinity, 33kV distribution lines of APDCL shall also be terminated in Khumtai S/s.

The detailed L2 schedule has been approved by AEGCL.

Details of the project description is given in the main ESIA-ESMP report.

Policy, Legal and Administrative Framework: 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.

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 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 will be evaluated after conducting check survey and accordingly Abbreviated Resettlement Action Plan (ARAP) will be prepared

The ESS 3 is applicable if indigenous peoples are present in, or have a collective attachment to, the proposed area of the project, and are likely to be affected by the project. Assessment for requirement of ESS 3 will be conducted after check survey for all the three nos. of transmission lines and Indigenous People Plan (IPP) will be prepared accordingly.

AEGCL has experience in development and management of E&S instruments per MDBs' requirements. AEGCL's working operation safety manual also serves as its commitment towards fulfilling the E&S responsibilities including occupation health and safety.

Decription of the Environment: The project site is located in Khumtai, Sarupathar, Golaghat and Morongi of Golaghat district. The project footprint (RoW) is spread across 40 villages for three numbers of Transmission Lines. The entire Project area for three transmission lines doesn't fall under scheduled area as defined by the Indian Constitution.

No Schedule area, national park, wildlife sanctuaries, biosphere reserves, notified historical and cultural sites etc. are falling in the entire Project area for three transmission lines.
The direct impacts from the project may be limited to the project footprint (RoW). Indirect/induced impacts to Area of Influence (AoI) which is considered as 2 km distance on both sides of Transmission

line for the environmental and social base line and 10 km distance for assessing the flora and fauna of the area.

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 Kumtai S/s. Secondary data / information has been collected from reliable sources for geology, hydrology, landuse, meteorology, ecology and socio-economics.

In the study area the land is primarily used for agriculture / crops (Tea Garden). The other land uses in the area are trees / vegetation, built up and water bodies.

Golaghat district shows a monotonous plain topography towards north and southeast, while the southwestern part of the area represents an undulating topography. The general elevation of the elevated area is around 100 meters above Mean Sea Level (MSL) and low-lying areas show altitude about 80 m above MSL. Maximum height of about 128 m above MSL is observed in the southern parts of the district, where it merges with the hills of the Nagaland as well as Karbi-Anglong district of Assam. The slope of the district is towards northeast from south.

Mostly a plain/flat Terrain has been found in the study area of transmission lines. Elevation of project corridor (i) LILO of 220 kV Samaguri – Mariani and (ii) LILO of 132 kV Jorhat (W)-Bokakhat is 26 to 75 m whereas (iii) 132 kV D/C Khumtai (AEGCL-New) – Sarupathar is 18 to 140 m respectively. The DEM map of the study area is presented in **Figure 4.3 A, B & C.**

The drainage of Golaghat district is dominated by mighty Brahmaputra River which is flowing in east-west direction in the extreme northern parts of the district and its tributaries flowing in northern direction. The entire drainage system of the district plays an important role in the ground water occurrence and balance of the district. Important Rivers of the district are Dhansiri and Dayang. These rivers have meandering courses with abandoned channels in the form of water bodies and ox-bow lakes along their courses.

The RoW of all the three transmission lines passes through several water courses.

Geologically the district is underlain by Quaternary formation followed by Archaean group of rocks. Normal climate profile for the whole state of Assam is humid sub-tropical climate zone. Temperature Golaghat district as per the CGWB booklet of Golaghat, the climate of the district is subtropical and humid characterized by moderate rainfall. The maximum temperature goes up to 36°C during June - July and minimum temperature falls to 6°C in December - January. Relative Humidity Golaghat district as per the report of CGWB of Golaghat district, 93 to 95% during morning hours and during afternoon hours it varies from 53 to 75%. Rainfall Golaghat district Golaghat district gets a south-west monsoon rainfall of around 2012 mm from the month of April and continues up to September - October. As per the Climatological Normals (1971-2000), the mean annual rainfall was recorded as 3324.9 mm.

As per the report of CGWB (2013), sub-surface geology as evidenced from available data infers that the potential aquifer pertaining to Quaternary formation exist down to the explored depth of 300 m. The cumulative thickness of aquifer zones has the tendency to increase towards the north and in the south-eastern parts, the thickness reverses considerably. The hydrogeology of the district is characterized by ground water occurring under water table to confined conditions. Depth to water level in major parts of the district varies from 2 to 5 m. In the extreme southern and southwestern parts close to hills, the water level is found to be deeper and generally rests within 5 to 7 m. The movement of ground water is from south to north. The water level trend shows that there is gradual rising of water level in the district. The study of water level fluctuation by CGWB during pre and post monsoon revealed that during pre-monsoon period about water level marked up to 3.8 to 7.96 m bgl. During post-monsoon period water level marked above 3.31 – 6.89 m bgl.

There are (i) 3 Schools and Colleges, 1 Hospitals, 1 Places of worship and 1 Cultural Centre in LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S. /C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line; (ii) 2 Schools and Colleges, 1 Hospitals and 1 Places of worship LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line; (iii) 20 Schools and Colleges, 3 Hospitals, 10 Places of worship, 2 Office, 1 Market places and 1 Bus Stop in Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line. Details of sensitive receoprs within 500 m from the centerline of the TL against the tower are given in main report.

Based on the observation at site it has been perceived that the ambient air quality of the project footprint and study area is good. The ambient air quality monitoring conducted in **Khumtai S/s** shows that the value of PM_{10} and $PM_{2.5}$ are 59 & 32 $\mu g/m^3$ respectively.

Based on the observation at site it has been perceived that the project footprint and study area has very minimal noise level. The ambient noise level monitoring conducted in **Khumtai S/s** shows that day time and night time noise level is 42.5 and 35.1 dB(A) respectively.

The data for T/L will be taken by EPC contractor for sensitive receptor location for Ambient Air Quality and Noise level on Noise level within 100 m from Center Line only during CESMP report preparation which will be considered as baseline data and provided in updated ESIA-ESMP report.

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

The habitats in the study area include agricultural land, homestead plantation, open scrub, water bodies and open forest areas.

The transmission line wise number of trees including fruit & non fruit bearing, shade trees of tea garden and bamboo etc. are as under:

- 220kv Samaguri to Mariani- 357 nos. trees
- 132kv Jorhat West to Bokakhat - 479 nos. trees
- 132 kV Sarupathar to Khumtai - 3256 nos. trees

23 species of mammals, 9 species of reptiles, 3 species of amphibians and 4 species of Avifauna were reported from the study area during site visit. Out of these, 5 Endangered, 5 Vulnerable and one Near Threatened mammal; one Critically Endangered and two Near Threatened Reptile and one Critically Endangered Avifauna has been recorded from the study area as per IUCN.

An Analysis for critical habitat (Key Biodiversity Areas) by obtaining data from The World Database of Key Biodiversity from the center line of T/L within 5km (Garampani Nambor Doigrung WLS); 10 km – (Garampani Nambor Doigrung WLS and Tirap – Patkai and Namphai); and 50 km – (East and North Karbi Anglong WLS, Kaziranga National Park, Gibbon (Hollongapar) Sanctuary, Majuli, Jhanjimukh – Kokilamukh, Dhansiri reserve Forest, Doyang Reservoir and Pangti Forest). The Garampani Nambor Doigrung WLS is within 1 km from Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line– 61.205 km. The species White-winged Duck (*Cairina scutulata*), Lesser Adjutant (*Leptoptilos javanicus*) are the Species triggering Key Biodiversity Area (KBA) criteria.

Archaeological and Historical Monuments are coming in the proposed route alignments.

The land for the 220kV LILO of Samaguri - Mariani transmission line tower base is comprised of land from five villages. The land for 132 kV Jorhat West - Bokakhat transmission line tower base is comprised of land from four villages, namely Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai. For 132 kV D/C Khumtai - Sarupathar transmission line tower base is comprised of thirty-one villages. The socio-economic profile/details of the study area would be provided in due course of time in the Abbreviated Resettlement Action Plan.

Justification for the selected alignment option: It is to be noted that during ESIA study, the route for transmission line was already finalized.

220kV D/C Samaguri-Mariani CKT I LILO Transmission Line: Length of Alternative I is slightly longer than alternate II, but involves only one minor river crossing, whereas is two minor rivers crossing in

alternativre II. Based on above facts, Alternative I was considered as the most optimal route and is recommended for erection of transmission line.

132kV D/C Jorhat West- Bokakhat LILO Transmission Line: Length of Alternative I is less than alternate II&III. Alternative I was considered as the most optimal route and is recommended for erection of transmission line though Angle Point in alternative I is more i.e. 33 as compered to alternate II & III, i.e 15 & 18 respectively.

132kV D/C Khumtai – Sarupathar Transmission Line: Thoogh Alternative I is longest in length than Alternative II & III but does not involve any Forest (Reserved Forest & Protected Forest), Low Land Area as compared to other alternative routes. There is no Affected Permanent structure in Alternate I, apart from few temporary structures, whereas alternate II&III have Affected Permanent structure. Construction and O&M problems that are less anticipated in alternate I, as compared to alternative II&III. Based on above analysis, Alternative I was considered as the most optimal route and is recommended for erection of transmission line.

Impact Assessment: Environmental sensitive sites and Key Biodiversity Areas (KBA) are away from the center line of the three transmission lines. No land is acquired permanently for tower foundation & RoW; ownership of land will be remains with the owner and agricultural activities are allowed to continue after construction activity. However, compensation for land for tower footing and RoW will be paid as per Ministry of Power, Government of India (MoP, GoI) guidelines and Zirat Value (tree and crop damages) will be paid to the individual landowners as per compensation procedures. As assessed from the site visit and observation, the impacts are manageable as no major environmental and social issues have been recorded. Details of impact 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 design stage.

Stakeholder & Public Consultation and Information Disclosure: Public consultations were conducted with local habitants where sixty-four participants were participated in the three transmission lines to Khumtai S/s like economically weak communities, women, vulnerable groups and other local community leaders nearby the proposed transmission lines on 17th March,2023, 17th May,2023, 17th December, 2023 at 132 kV D/C Jorhat to West Bokakhat. Transmission line, 6th April,2023, 25th September, 2023, 17th February, 2024, 10th March, 2024, 6th April, 2024 at 132 kV D/C Khumtai to Sarupatha TL and on 28th June, 2023, 22th July,2023, 30th October,2023, 3rd January,2024, at 220kV LILO of Samaguri - Mariani at Khumtai Transmission Line.

The transcript of these discussions will help AEGCL and EPC contractor for proper needs assessment to ensure the issues raised by people are addressed appropriately. Consultation will be carried out on an on-going basis throughout the sub-project cycle.

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 and when payment can be expected to receive by the PAF. Further, the PAF has shown their interest on 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.

The transcript of these discussions will help AEGCL and the EPC contractor to conduct a proper needs assessment to ensure the issues raised by people are addressed appropriately. Consultation will be carried out on an on-going basis throughout the sub-project cycle. This draft ESIA - ESMP will be disclosed online on the website of AIIB and AEGCL. Their hardcopies in English are available at the following locations:

1. PMU: Project Director,
   Address: 1st Floor, AEGCL, Bijulee Bhawan,
   Contact No.: 0361-2739520
   Website: www.aegcl.co.in,
   Contact Person: Mrs. Jayashree Devi
2. PIU:

Name of the T&T Circle	Name of the Project Districts	Pkg	Name of EPC Contractor	Sub Projects	Focal point / Nominated Official	Contact number (Mobile and WhatsApp)	Communication Address
Jorhat	Golaghat	D	M/s R. S. Infraprojects Pvt. Ltd. JV with M/s Parth Electricals	Khumtai S/S	Sri Mausam Deka, DM	8638612407	O/o The DGM, UATTC, AEGCL, LMTC, Garmur, Jorhat, 785007

Rievance Redress Mechanism (GRM): If any 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.

The executive summary in English and Assamese can be found at the following locations:

1. PMU: Project Director,
   Address: 1st Floor, AEGCL, Bijulee Bhawan,
   Contact No.: 0361-2739520
   Website: www.aegcl.co.in,
   Contact Person: Mrs. Jayashree Devi

2. PIU: As mentioned in table above.

3. GRC

Tier 2:

(i) Chief General Manager (CGM, PP&D), AEGCL

Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in
Contact Person: Mrs. Jayashree Devi
(ii) PMU: Project Director,
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in,
Contact Person: Mrs. Jayashree Devi

Tier 1: As mentioned in table above.

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 members should uphold the objectives of the GRM and strive to achieve them. The primary objectives of GRM are:

- Provide an accessible, transparent, efficient and predictable mechanism for resolution of grievances to all project 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:
        - Registrations in the GRM log 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.

The GRM can be accessed through the following channels:

- Project Sign board
- Display in PIU office/T&T Circle office
- To be upload in the AEGCL web site

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 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 25.80 Lakhs** is estimated to be required for implementation of ESMP.

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.

Summary, Recommendations and Conclusion: 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 mainainting 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.

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 equipments at substations.

As part of AIIB's E&S policy 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 three numbers of Transmission Lines namely:

A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km,
B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line – 10.198 km,
C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km.

1.2 Purpose of the report

Power transmission projects have not been listed in the list of environmentally sensitive projects and hence, no Environmental Clearance (EC) 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.

AIIB requires an ESIA – ESMP for transmission lines to be covered under its investment in compliance with its E& S Policy.

In line with preparation of ESIA – ESMP report, the present 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 project, in keeping with the AIIB's E&S Policy and accordingly prepare Environment and Social Management Plan (ESMP) 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 national, state, international and AIIB's legal policy. Environmental Clearance is not required as per the EIA Notification of MoEF&CC. The project has been categorised as "Category B" as per AIIB's E&S policy with reservation as per the approved ESMPF and thus requires an ESIA – ESMP for transmission lines to be covered under its investment.

In addition to the policy and legal requirement mentioned in approved ESMPF, 5 numbers towers (AP 33/0, AP 33/1, AP 34, AP 34/1 and 35/0) near village 1 no. Herhari village (1175m) comes under Dayang Reserve Forest as per detailed survey report. During ESIA-ESMP report preparation, as per the remote sensing database, it has been found that, 4 numbers of tower (AP 33/0, AP 33/1, AP 34, AP 34/1) comes under Dayang Reserve Forest, Golaghat Forest Division. In reply of the recent communication of AEGCL, Sarupathar Revenue Circle office confirmed that, tower no. AP 33, AP 33/1, AP 34 and AP 34/1 fall under 1 no. Herhari Gaon under Barpathar Mouza, in Saripathar Revenue Circle and not comes under Forest Land **(Appendix 1A).** Moreover, Golaghat Forest Division vide letter dated 23.08.2024 also confirmed that AP 33 to AP 34/1 does not falls within the Dayang Reserve Forest under Golaghat Division **(Appendix 1B).**

Scoping: Reconnaissance survey within the project footprint, 2 km and 10 km (for biodiversity assessment) from either side of transmission lines to assess environmental and social sensitivity has been done for gathering baseline data.

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 February 2024 from secondary sources. Site reconnaissance survey has been conducted in April 2024 by comprising team of Environmental & Social Experts of PMU & PMC along with Environmental & Social Investigation officers of PMC.

Impact Assessment: Imapact Assessment has been done (identification, prediction and evaluation) based on the available data from primary & secondary sources 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 detailed survey, observations made during site survey and consultation and thus there is requirement of update of this report after receiving of awaiting informations from check survey.
- The consultations undertaken as part of the ESIA to the stakeholders, who were available for consultation during the site visit; which included local community;
- The number of impacted land owners is likely to be compiled after the socio-economic survey of the Project Affected families (PAFs). ESS 2 will be evaluated after conducting check survey and accordingly Abbreviated Resettlement Action Plan (ARAP) will be prepared. Assessment for requirement of ESS 3 will be conducted after check survey for all the three nos. of transmission lines and Indigenous People Plan (IPP) will be prepared accordingly.

This ESIA – ESMP report will be updated by AEGCL / PMC after completion of Check Survey.

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, profile of the project route, overview of activities during different phases of the project, land requirement and allotment process.
Chapter 3	Policy, legal and institutional framework	This chapter describes the applicable national, state level and AIIB's environmental and social laws and regulations and institutional framework.
Chapter 4	Description of the Environment	This chapter describes the Baseline Environmental features in detail. It includes details about location characteristics, study area, physical

Chapter No.	Chapter Name	Contents
		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 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.
Chapter10	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 mitigative 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 summarize 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, has planned to execute "Assam Intra-State Transmission System Enhancement Project" to materialize the vision of Govt. of India to provide "Power for All" (PFA) and evacuate power from Generating Plants of the State as well as from Central Sector Generating Utilities and other sources as well as strengthen the Grid Infrastructure of the State reducing the transmission losses. AEGCL is responsible for transmission of electricity to the Distribution Company (DisCom) 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.

The present report focusses on three numbers of Transmission Lines namely:

A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line - 10.167 km,

B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line - 10.198 km,

C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km.

The above-mentioned Transmission Line corridors are located in the Tehsil Khumtai, Sarupathar, Golaghat and Morongi in the District of Golaghat, State of Assam. Map showing all three transmission lines and a brief description of the Transmission Line corridors is given in Figure and table below.

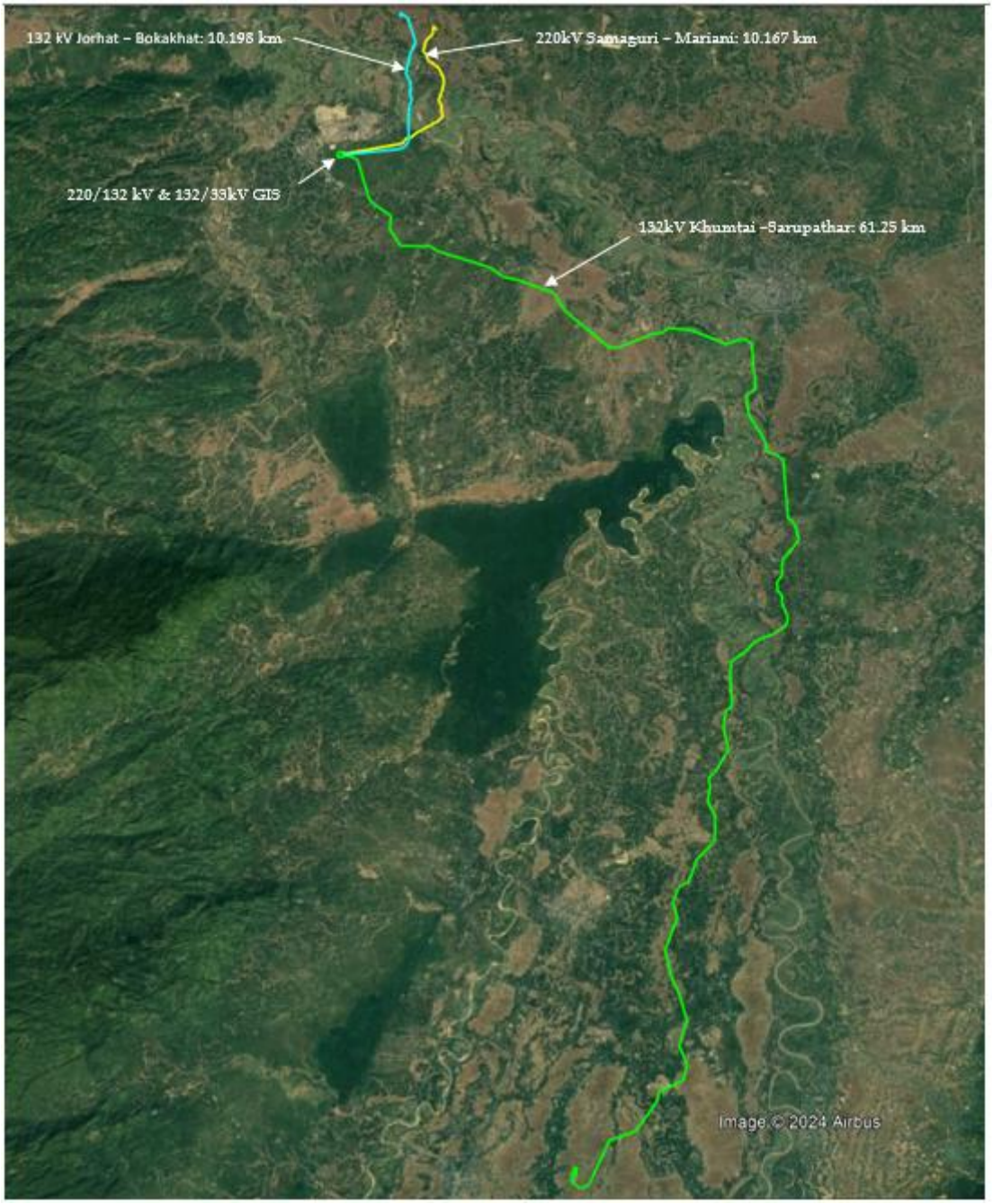


Figure 2.1: Map showing all three transmission lines

Table 2.1: Brief Description of Transmission Line corridors

Sl. No.	Particulars	Description		
		A. LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line – 10.198 km**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km**
1.	Location Coordinates (start and end)	The project footprint lies between 26°37'38.90"N 93°49'19.10"E to 26°34'22.50"N 93°47'1.14"E.	The project footprint lies between 26°38'0.80"N to 26°34'8.10"N latitude and 93°48'24.30"E to 93°47'15.50"E longitude	The project footprint lies between 26°11'48.20"N to 26°34'6.50"N latitude and 93°54'7.40"E to 93°47'15.70"E longitude
2.	Project affected Village	Helochi Gaon, Khumtai-Nagaon, Leteku Chapori, Gandhi Gaon, Khumtai.	Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai.	Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai.
3.	Tehsil	Khumtai and Morongi	Khumtai and Morongi	Sarupathar, Golaghat andMorongi
4.	District Name / State	Golaghat / Assam	Golaghat / Assam	Golaghat /Assam
5.	Capacity of Transmission line	LILO of 220 kV.	LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line Khumtai Grid Substation: 220/132kV (2X160MVA), GIS substation	Khumtai (AEGCL-New) - Sarupathar (AEGCL-Existing) 132 kV S/C Line Khumtai Grid Substation: 220/132kV (2X160MVA), GIS substation
6.	Power Evacuation	The transmission line will evacuate power from existing transmission line at Tower Number (TN) 365 - TN 366.	The transmission line will evacuate power from existing transmission line at TN 233 - TN 234.	The transmission line will evacuate power from Sarupathar Grid Substation.
7.	Climatic zone	Sub-tropical Humid	Subtropical Humid	Subtropical Humid
8.	Elevation	26 to 75 meters	95 meters	95 meters
9.	Site Conditions	Mostly flat agricultural land and tea	Mostly flat agricultural land	Mostly flat agricultural land and tea

Sl. No.	Particulars	Description		
		A. LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line – 10.198 km**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km**
		garden in the footprint of transmission towers along the transmission line.	and tea garden in the footprint of transmission towers.	garden in the footprint of transmission towers along the transmission line.
10.	Road Accessibility	Site could be accessed through Dhodar Ali road and Leteku Chapori road which connects to village roads of the area.	Site could be accessed through Dhodar Ali road and Letekujan road which connects to village roads of the area.	Site could be accessed through Letekujan-Sarupathar road which connects to village roads of the area.
11.	Road crossing	National Highway: 1 location of NH-39 (17/0 – 18/0). State Highway: Nil Village Roads / cart track: 7 locations	National Highway: 1 location of NH- 129 (13/0 – 14/0) State Highway: 1 location (4/1 – 5/0). Village Roads/ cart track: 16 locations	• National Highway: 1 location of NH- 39 (67/1 – 68/0) • State Highway: Nil • Village Roads/ cart track: 95 locations
12.	Nearest Airport	Nearest Airport is at Jorhat airport approx. Distance is 42 Km form Khumtai S/S.	Nearest Airport is at Jorhat airport approx. Distance is 42 Km form Khumtai S/S.	Nearest Airport is at Jorhat airport approx. Distance is 42 km form Khumtai S/S and Dimapur Airport station approx distance 38 km from Sarupathar S/S.
13.	Nearest Railway Station	This area mainly connected with N.F. Railway Jorhat – Furkating Branch. Nearest Railway station is Khumtai, Numaligarh.	This area mainly connected with N.F. Railway Jorhat – Furkating Branch. Nearest Railway station is Khumtai, Numaligarh.	This area mainly connected with N.F. Railway. Nearest Railway station is Khumtai, Numaligarh, Hautley, Adharsatra, Golaghat, Furkating, Sarupather, Barpathar, Noajan, Bhilgaon, Jamguri, Oating etc.
14.	Railway crossing	1 number - NF Railway extension to Numaligarh Refinery (11/0 – 12/0)	1 number - NF Railway extension to Numaligarh Refinery (9/0 – 10/0)	1 number - NF Railway (47/0 – 48/0)
15.	River/canal/nallah/ pond crossing	River: 1 (Dhanshiri River) Canal: Nil Nallah: 1 location	River: 3 (Dhanshiri River) Canal: Nil Nallah: 5 locations	River: 3 (2 times Dhanshiri River, 1-timeDoigrang River) Canal: 1

Sl. No.	Particulars	Description		
		A. LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line – 10.198 km**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km**
		Pond/ Water body: 4 locations	Pond/ Water body: Nil	Nallah: 50 locations Pond/ Water body: 22
16.	Number of Powerline (66 kV and above) crossing	220kV S/C Samaguri - Mariani (Line-II) - 1 location 132 kV D/C proposed LILO of Jorhat West - Bokakhat at Khumtai – 1 location	Proposed 220kV LILO of Samaguri - Mariani at Khumtai S/S - 1 location	400KV D/C M-M T/L- 1 location 132KV S/C Mariani - Bokajan T/L- 1 location 66KV S/C Gholaghat - Bokajan T/L- 1 location
17.	Forest / Protected areas	Nil	Nil	5 numbers towers (AP 33/0, AP 33/1, AP 34, AP 34/1 and 35/0) near village 1 no. Herhari village (1175m) comes under Dayang Reserve Forest as per detailed survey report. During ESIA-ESMP report preparation, as per the remote sensing database, it has been found that, 4 numbers of tower (AP 33/0, AP 33/1, AP 34, AP 34/1) comes under Dayang Reserve Forest, Golaghat Forest Division. In reply of the recent communication of AEGCL, Sarupathar Revenue Circle office confirmed that, tower no. AP 33, AP 33/1, AP 34 and AP 34/1 fall under 1 no. Herhari Gaon under Barpathar Mouza, in Saripathar Revenue Circle and not comes under Forest Land (Appendix 1A). Moreover, Golaghat Forest Division vide letter dated 23.08.2024 also confirmed that AP 33 to AP 34/1 does not falls within the Dayang Reserve Forest under Golaghat Division (Appendix 1B).
18.	Land Requirement	Transmission Corridor (35.5845 hectare	Transmission Corridor (27.54 ha considering 27 m RoW	Transmission Corridor (165.25 ha considering 27 m RoW

Sl. No.	Particulars	Description		
		A. LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line – 10.198 km**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km**
		considering 35 m Right of Way (RoW width and 10167 m length of Transmission Corridor). Tower Base Area: for DA type towers are approx. 71 to 147 sqm. DB type towers is approx. 98 to 203 sqm., DC type towers is approx. 122 to 241 sqm. and DD type towers is approx. 184 to 358 sqm. The tower base area for 35 numbers of tower of will require an area of 0.16 ha of land which may vary after finalization of land schedule.	width and 10198 m length of Transmission Corridor) Tower Base Area: DA type towers 169.77 sqm, DB type towers 46.57 sqm, DC type towers 171.47 sqm and DD type towers 185.26 sqm. The tower base area for 33 numbers of tower of will require an area of 0.15 ha, out of which 0.71 ha of land, which may vary after finalization of land schedule.	width and 61205 m length of Transmission Corridor). Tower Base Area: DA type towers 995.75 sqm, DB type towers 181.5 sqm, DC type towers 289.75 sqm and DD type towers 659 sqm. The tower base area for 200 numbers of tower will require an area of 0.85 ha of land, which may vary after finalization of land schedule.
19.	Land Availability	Obtained RoW permission from District Administration.	Obtained RoW permission from District Administration.	Obtained RoW permission from District Administration.
20.	Access Road	The project shall primarily use the existing roads in the area. In addition to this, temporary access routes shall be built for the tower construction phase.	The project shall primarily use the existing roads in the area. In addition to this, temporary access routes shall be built for the tower construction phase.	The project shall primarily use the existing roads in the area. In addition to this, temporary access routes shall be built for the tower construction phase.
21.	Water Requirement: Construction Phase	The transmission line generally requires about 50 m^3 of water for	The transmission line generally requires about 50 m^3 of water for casting of	The transmission line generally requires about 50 m^3 of water for casting of

Sl. No.	Particulars	Description		
		A. LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line – 10.198 km**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km**
		casting of foundations for each tower, which shall be sourced from local sources through tankers.	foundations for each tower, which shall be sourced from local sources through tankers.	foundations for each tower, which shall be sourced from local sources through tankers.
22.	DG sets	DG Set (5 kVA)	DG Set (5 kVA)	DG Set (5 kVA)
23.	Soil Characteristics	Mostly alluvial soils (Vary from sandy loams to sands)	Mostly alluvial soils (Vary from sandy loams to sands)	Mostly alluvial soils (Vary from sandy loams to sands)
24.	Seismic Zone	Seismic Zone V – Earthquake Hazard Zone.	Seismic Zone V – Earthquake Hazard Zone.	Seismic Zone V – Earthquake Hazard Zone.
25.	High Flood Level	Golaghat district - 80.18 m	Golaghat district - 80.18 m	Golaghat district - 80.18 m
26.	Wind zone	The Project area falls in a moderate damage risk zone A (V_b = 39-44 m/s)	The Project area falls in a Moderate damage risk zone A (V_b = 39-44 m/s)	The Project area falls in a Moderate damage risk zone A (Vb = 39-44 m/s)

Source: Detailed Survey report and site visit

Survey of India Toposheet showing transmission line, Environmental and Social Features are given figure below**.**

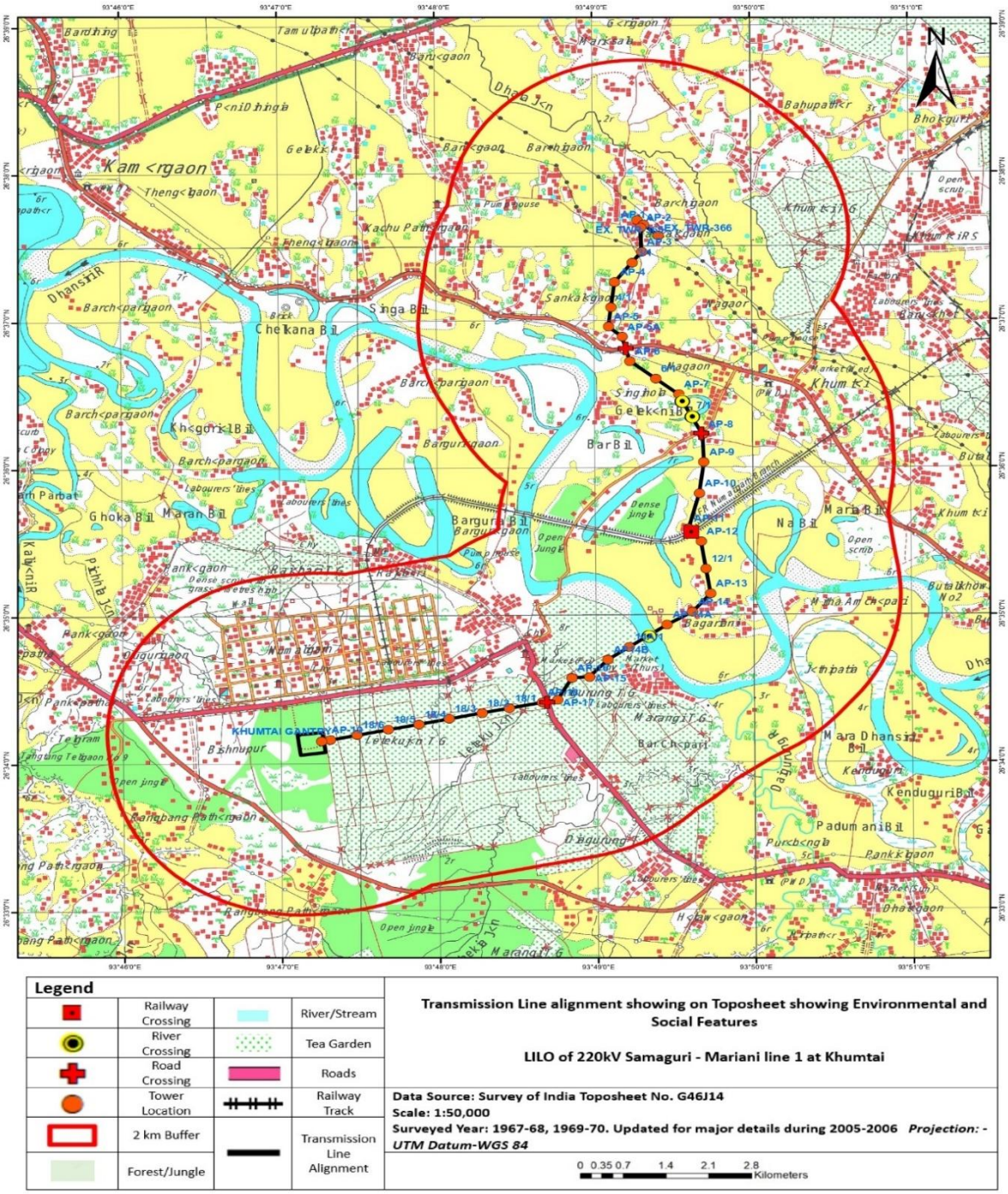


Figure 2.2 A: Survey of India Toposheet showing transmission line, Environmental and Social Features of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

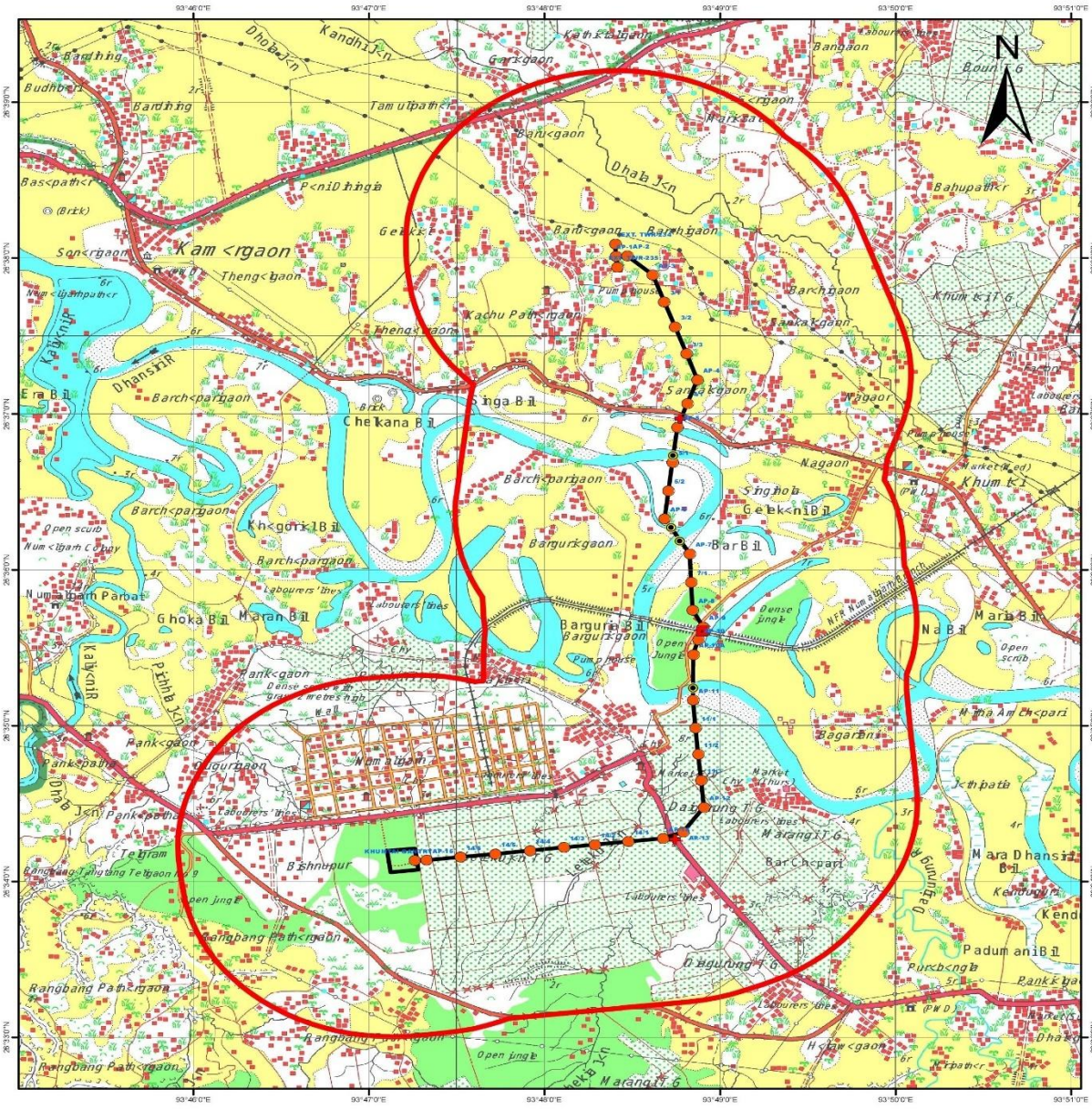
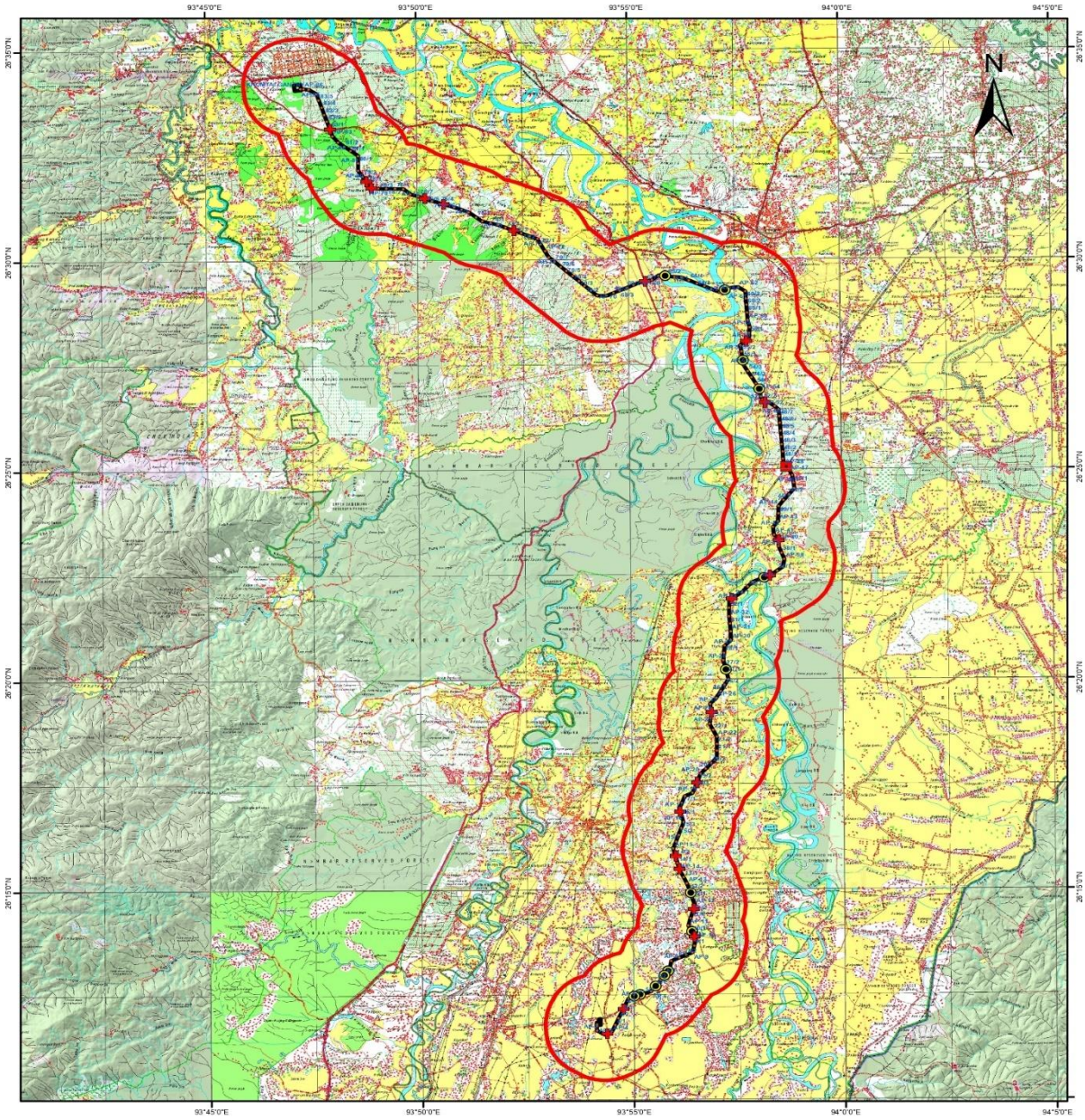


Figure 2.2 B: Survey of India Toposheet showing transmission line, Environmental and Social Features of LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line



Legend				Transmission Line alignment showing on Toposheet showing Environmental and Social Features 132 kV Khumtai (New) - Sarupathar (Existing) S/C Line
	Railway Crossing		River/Stream	
	River Crossing		Tea Garden	
	Road Crossing		Roads	
	Tower Location		Railway Track	Data Source: Survey of India Toposheet No. G46J10, G46J11, G46J12, G46J14, G46J15, G46J16, G46K2, G46K3, G46K4 Scale: 1:50,000 Surveyed Year: 1967-68, 1969-70. Updated for major details during 2005-2006 *Projection: - UTM Datum-WGS 84*
	2 km Buffer		Transmission Line Alignment	
	Forest/Jungle			0 0.35 0.7 1.4 2.1 2.8 Kilometers

Figure 2.2 C: Survey of India Toposheet showing transmission line, Environmental and Social Features of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

Table 2.2: IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard

S. No.	Transmission lines 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

Based on the facts of above table, it can be assumed that, electrocution of primate/monkey and bird's wingspan has not been anticipated by touching two cables.

Technical details along with layout, design, and other parameters of the towers (different type) and conductors etc. are given in **Appendix -2.**

Other equipment's etc. to be installed are given in **Appendix 3A & 3B.**

Detailed methodology for installation of towers and stringing of conductors given in **Appendix 4A &4B.**

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

Resources

- No of Foundation 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. 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. They need to be built through environmentally and socially non - sensitive areas.

2.2 Profile of the project route

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

Table 2.3: Components of the associated transmission lines

Sl. No.	Particulars	Description		
		A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line**
1	Length of TL route	10.167 km	10.198 km	61.205 km
2	No. of Transmission Towers	35 nos.	33 nos.	200 nos.
3	Circuit type	Single Circuit	Single Circuit	Double Circuit
4	Type of conductor	ACSR Zebra 85^0	AAAC Panther 95^0	AAAC Panther 95^0
5	Type of tower	220 kV DA, DB, DC, DD - series Tower	132 kV DA, DB, DC, DD - series Tower	132 kV DA, DB, DC, DD - series Tower
6	Insulator used	Porcelain Insulators	Porcelain Insulators	Porcelain Insulators
7	No. of Angle Points (AP)	19	15	86
8	Span	(350-380) m	325 m	325 m
9	Ground coverage area	Average- 238 sqm.	Average- 195 sqm.	Average- 195 sqm.
10	Height of tower	A-39.6m, B, C, D-33.85m	A-29.450m, B, C, D- 28.665m	A-29.450m, B, C, D- 28.665m
11	Design of tower	A, B, C, D series towers	A, B, C, D series towers	A, B, C, D series towers
12	RoW of transmission line	35m	27m	27m
13	Tower Accessories	Danger plates, number plates, phase plates, circuit plates, anti-climbing plates etc.	Danger plates, number plates, phase plates, circuit plates, anti-climbing plates etc.	Danger plates, number plates, phase plates, circuit plates, anti-climbing plates etc.
14	Minimum ground clearance	7m	6.1m	6.1m
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	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	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

Sl. No.	Particulars	Description		
		A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line	**B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line**	**C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line**
		stakeholders and local people as per requirement.	stakeholders and local people as per requirement.	stakeholders and local people as per requirement.

Source: Detailed Survey report

The profiling of transmission line towers is provided in the following table.

Table 2.4: Profiling of Transmission Line Towers as per detailed 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
A - LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line						
1.	EXT- 335	93°49'16.7"E 26°37'40.9"N	Agricultural land	Agricultural land	---	---
2.	AP-1	93°49'19.1"E 26°37'38.9"N	Agricultural land	Agricultural land	---	---
3.	AP-2	93°49'18"E 26°37'37.8"N	Agricultural land	Agricultural land	---	Village road
4.	AP-3	93°49'18.2"E 26°37'27.8"N	Agricultural land	Agriculture & non agriculture land	---	
5.	3/1	93°49'14.6"E 26°37'23.5"N	Agricultural land	Agriculture & non agriculture land	Pond	---
6.	AP-4	93°49'7.9"E 26°37'15.6"N	Agricultural land	Agriculture & non agriculture land		---
7.	4/1	93°49'6.5"E 26°37'5.4"N	Agricultural land	Agriculture & non agriculture land	---	---
8.	AP-5	93°49'5.5"E 26°36'57.5"N	Agricultural land	Agriculture & non agriculture land	---	Bitumen road
9.	5A/0	93°49'10.6"E 26°36'53.3"N	Agricultural land	Agricultural land	---	
10.	AP-6	93°49'13.5"E 26°36'43.4"N	Agricultural land	Agriculture & non agriculture land	---	---
11.	6/1	93°49'23.3"E 26°36'36.2"N	Agricultural land	Agriculture & non agriculture land	---	---
12.	AP-7	93°49'32"E 26°36'29.8"N	Agricultural land	Agriculture & non agriculture land	---	---
13.	7/1	93°49'36.6"E 26°36'21.4"N	Agricultural land	Agriculture & non agriculture land	---	---
14.	AP-8	93°49'40.9"E 26°36'13.4"N	Agricultural land	Agriculture & non agriculture land	Pond	RCC 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
15.	AP-9	93°49'41.4"E 26°36'2.2"N	Agricultural land	Agriculture land		bitumen road
16.	AP-10	93°49'39.6"E 26°35'49.4"N	Agricultural land	Agriculture & non agriculture land	---	---
17.	AP-11	93°49'35.4"E 26°35'35.1"N	Agricultural land	Agriculture & non agriculture land	---	Village road
18.	AP-12	93°49'40.1"E 26°35'29.9"N	Agricultural land	Agriculture & non agriculture land	---	
19.	12/01	93°49'41.9"E 26°35'18.7"N	Agricultural land	Agriculture & non agriculture land	---	---
20.	AP-13	93°49'43.6"E 26°35'8.6"N	Agricultural land	Agriculture & non agriculture land	---	Village road
21.	AP-14	93°49'36.7"E 26°35'1.3"N	Agricultural land	Agriculture land	---	
22.	14A/0	93°49'26.9"E 26°34'56"N	Agricultural land	Agriculture land	Dhanshiri River	---
23.	14A/1	93°49'12.5"E 26°34'47"N	Agricultural land	Agriculture land		---
24.	14B/0	93°49'4.4"E 26°34'41.9"N	Tea garden land	Tea garden land		Tea garden road
25.	AP-15	93°48'57.3"E 26°34'34.9"N	Tea garden land	Tea garden land	Drain	
26.	AP-16	93°48'50.6"E 26°34'34.5"N	Tea garden land	Tea garden land	---	---
27.	AP-17	93°48'45.1"E 26°34'25.6"N	Tea garden land	Tea garden land	---	NH-39, Tea Garden Road
28.	AP-18	93°48'39.2"E 26°34'24.6"N	Tea garden land	Tea garden land	---	
29.	18/1	93°48'26.8"E 26°34'22.3"N	Tea garden land	Tea garden land	---	---
30.	18/2	93°48'16.4"E 26°34'20.4"N	Tea garden land	Tea garden land	---	Tea garden road
31.	18/3	93°48'4"E 26°34'18.1"N	Tea garden land	Tea garden land	---	
32.	18/4	93°47'52.5"E 26°34'15.9"N	Tea garden land	Tea garden land	Drain	---
33.	18/5	93°47'40.8"E 26°34'13.8"N	Tea garden land	Tea garden land		---
34.	18/6	93°47'28.9"E 26°34'11.6"N	Tea garden land	Tea garden land	---	---
35.	AP-19	93°47'18.7"E 26°34'9.7"N	Tea garden land	Tea garden land	---	Tea garden road
36.	Bay Gantry	93°47'15.4"E 26°34'9.2"N	Tea garden land	Tea garden land	---	
37.	EXT -366	93°49'24.74"E 26°37'34.45"N	Agricultural land	Agricultural land	---	---
B - LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line						
1.	EXT. TN.-233	93°48'24.2"E 26°38'5.4"N	Agricultural land	Agricultural land	Nil	---
2.	AP-1	93°48'24.3"E 26°38'0.8"N	Agricultural land	Agricultural land	Nil	---
3.	AP-2	93°48'28.2"E 26°38'0.9"N	Agricultural land	Agricultural land	Nil	---

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
4.	AP-3	93°48'37"E 26°37'53.5"N	Agricultural land	Agricultural land	Nil	Village road
5.	3/1	93°48'40.9"E 26°37'43.2"N	Agricultural land	Agricultural land	Nil	
6.	3/2	93°48'44.6"E 26°37'33.5"N	Agricultural land	Agricultural land	Nil	---
7.	3/3	93°48'48.5"E 26°37'23.2"N	Agricultural land	Agricultural land	Nil	---
8.	AP-4	93°48'52.2"E 26°37'13.2"N	Agricultural land	Agricultural land	Nil	---
9.	4/1	93°48'48.8"E 26°37'4.1"N	Agricultural land	Agricultural and non-agricultural land	Nil	SH
10.	AP-5	93°48'45.4"E 26°36'54.9"N	Government land	Agricultural and non-agricultural land	Dhansiri river	
11.	5/1	93°48'43.7"E 26°36'41.3"N	Government land	Agricultural land		---
12.	5/2	93°48'42.3"E 26°36'30.5"N	Government land	Agricultural land	Nil	---
13.	AP-6	93°48'41"E 26°36'19.7"N	Agricultural land	Agricultural and non-agricultural land	Dhansiri river	---
14.	AP-7	93°48'49.6"E 26°36'6.1"N	Government land	Agricultural land		---
15.	7/1	93°48'50.1"E 26°35'55.2"N	Government land	Agricultural land	Nil	---
16.	AP-8	93°48'50.6"E 26°35'44.5"N	Government land	Agricultural and non-agricultural land	Nil	---
17.	AP-9	93°48'54.2"E 26°35'38"N	Agricultural land	Agricultural and non-agricultural land	Nala	---
18.	AP-10	93°48'52.5"E 26°35'33"N	Government land	Agricultural land	Nil	---
19.	10A/0	93°48'50.8"E 26°35'27.4"N	Agricultural land	Agricultural and non-agricultural land	Dhansiri river	---
20.	AP-11	93°48'50.7"E 26°35'9.8"N	Government land	Agricultural land		---
21.	11/1	93°48'51.6"E 26°34'59.1"N	Agricultural land	Agricultural and non-agricultural land	Drain	---
22.	11/2	93°48'52.5"E 26°34'49"N	Agricultural land	Agricultural and non-agricultural land	Nala	Tea garden road
23.	11/3	93°48'53.5"E 26°34'39"N	Tea garden land	Tea garden land		
24.	AP-12	93°48'54.4"E 26°34'28.6"N	Tea garden land	Tea garden land	Nala, Drain	
25.	AP-13	93°48'47.3"E 26°34'19.1"N	Tea garden land	Tea garden land	Nala	NH-129
26.	AP-14	93°48'40.4"E 26°34'16.6"N	Tea garden land	Tea garden land	Nala	
27.	14/1	93°48'28.6"E 26°34'15.4"N	Tea garden land	Tea garden land		Tea garden road
28.	14/2	93°48'17.3"E 26°34'14.2"N	Tea garden land	Tea garden land	Nil	
29.	14/3	93°48'6.6"E 26°34'13.1"N	Tea garden land	Tea garden land	2 Nos Drain	
30.	14/4	93°47'55"E 26°34'11.9"N	Tea garden land	Tea garden land		
31.	14/5	93°47'43.2"E 26°34'10.6"N	Tea garden land	Tea garden land	Nil	

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
32.	14/6	93°47'31.3"E 26°34'9.4"N	Tea garden land	Tea garden land	Drain	
33.	AP-15	93°47'19.7"E 26°34'8.2"N	Tea garden land	Tea garden land	2 Nos Drain	
34.	BAY	93°47'15.5"E 26°34'8.1"N	Tea garden land	Tea garden land		
35.	EXT. TN.-234	93°48'24.89"E 26°37'56.57"N	Agricultural land	Agricultural land	Nil	Village road
C - Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line						
1.	Bay	93°54'7.4"E 26°11'48.2"N	Sarupathar S/S	Sarupathar S/S	Nil	---
2.	AP-1	93°54'7.00"E 26°11'45.60"N	Agricultural land	Agricultural land	Nil	---
3.	AP-2	93°54'7.20"E 26°11'39.20"N	Agricultural land	Agricultural land	Nil	---
4.	AP-3	93°54'18.80"E 26°11'33.10"N	Agricultural land	Agricultural land	2 Nos Nala	Metal road
5.	AP-4	93°54'28.50"E 26°11'37.40"N	Agricultural land	Agricultural land		
6.	4/1	93°54’33.20” E 26°11’46.90” N	Agricultural land	Agricultural land	Nil	---
7.	4/2	93°54'38.00"E 26°11'56.50"N	Agricultural land	Agricultural land	Nil	---
8.	4/3	93°54'42.80"E 26°12'6.10"N	Agricultural land	Agricultural land	Nala	Metal road
9.	4/4	93°54'47.40"E 26°12'15.20"N	Agricultural land	Agricultural land		
10.	AP-5	93°54'52.30"E 26°12'25.10"N	Agricultural land	Agricultural land	Nala	---
11.	5/1	93°55'3.60"E 26°12'28.40"N	Agricultural land	Agricultural land		Village road
12.	5/2	93°55'14.00"E 26°12'31.40"N	Agricultural land	Agricultural land	Nil	
13.	AP-6	93°55'24.30"E 26°12'34.40"N	Agricultural land	Agricultural land	Nil	Village road
14.	6/1	93°55'31.10"E 26°12'42.60"N	Agricultural land	Agricultural land	Nil	
15.	6/2	93°55'37.90"E 26°12'50.80"N	Agricultural land	Agriculture & non agriculture land	Nil	---
16.	6/3	93°55'44.60"E 26°12'58.90"N	Agricultural land	Agriculture & non agriculture land	Nil	Village road
17.	AP-7	93°55'51.00"E 26°13'6.70"N	Agricultural land	Agriculture & non agriculture land	Pond	
18.	AP-8	93°55'53.50"E 26°13'18.20"N	Agricultural land	Agriculture & non agriculture land		Village road
19.	8/1	93°56'4.60"E 26°13'22.50"N	Agricultural land	Agricultural land	2 Nos Nala	
20.	8/2	93°56'15.00"E 26°13'26.60"N	Agricultural land	Agriculture & non agriculture land		Village road
21.	AP-9	93°56'23.90"E 26°13'30.10"N	Agricultural land	Agricultural land	Nil	---
22.	9/1	93°56'26.30"E 26°13'39.70"N	Agricultural land	Agricultural land	Nil	---
23.	AP-10	93°56'28.60"E 26°13'49.20"N	Agricultural land	Agricultural land	Pond	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
24.	10/1	93°56'23.40"E 26°13'58.50"N	Government land	Agriculture & non agriculture land		
25.	AP-11	93°56'18.00"E 26°14'8.20"N	Agricultural land	Agriculture & non agriculture land	Nala	Village road
26.	11/1	93°56'21.20"E 26°14'18.50"N	Agricultural land	Agricultural land	Canal	
27.	11/2	93°56'24.40"E 26°14'28.50"N	Agricultural land	Agricultural land	Nil	Metal road
28.	AP-12	93°56'27.40"E 26°14'37.90"N	Agricultural land	Agricultural land	Nil	
29.	12/1	93°56'23.70"E 26°14'48.30"N	Agricultural land	Agriculture & non agriculture land	Nala	---
30.	12/2	93°56'20.10"E 26°14'58.70"N	Agricultural land	Agriculture & non agriculture land		Village road
31.	AP-13	93°56'16.70"E 26°15'8.50"N	Agricultural land	Agricultural land	Nil	
32.	13/1	93°56'11.70"E 26°15'17.70"N	Agricultural land	Agricultural land	Nil	Village road
33.	AP-14	93°56'6.50"E 26°15'27.20"N	Agricultural land	Agricultural land	Nil	
34.	14/1	93°56'3.50"E 26°15'37.70"N	Agricultural land	Agricultural land	pond	Metal road
35.	14/2	93°56'0.40"E 26°15'48.30"N	Agricultural land	Agricultural land	Pond	Village road
36.	AP-15	93°55'57.40"E 26°15'58.60"N	Agricultural land	Agricultural land	Nil	---
37.	15/1	93°56'1.40"E 26°16'8.60"N	Agricultural land	Agricultural land	Nil	---
38.	15/2	93°56'5.00"E 26°16'17.90"N	Agricultural land	Agricultural land	Nala	---
39.	15/3	93°56'8.70"E 26°16'27.30"N	Agricultural land	Agricultural land		---
40.	AP-16	93°56'12.20"E 26°16'36.10"N	Agricultural land	Agricultural land	Nala	---
41.	16/1	93°56'9.60"E 26°16'44.80"N	Agricultural land	Agricultural land	2 Nos Nala	Metal road
42.	AP-17	93°56'6.50"E 26°16'55.10"N	Agricultural land	Agricultural land		
43.	17/1	93°56'10.20"E 26°17'3.80"N	Agricultural land	Agricultural land	Pond	Village road
44.	AP-18	93°56'14.40"E 26°17'13.60"N	Agricultural land	Agriculture & non agriculture land	Pond	
45.	AP-19	93°56'25.80"E 26°17'17.90"N	Agricultural land	Agricultural land	Nil	Village road
46.	19/1	93°56'29.10"E 26°17'26.00"N	Agricultural land	Agriculture & non agriculture land	Nil	
47.	19/2	93°56'33.20"E 26°17'35.90"N	Government land	Agriculture & non agriculture land	2 Nos Pond	Village road
48.	AP-20	93°56'37.00"E 26°17'44.90"N	Government land	Agricultural land		Village road
49.	20/1	93°56'44.60"E 26°17'52.40"N	Agricultural land	Agricultural land	Nil	
50.	20/2	93°56'52.60"E 26°18'0.30"N	Agricultural land	Agricultural land	Nil	Village road
51.	AP-21	93°57'0.40"E 26°18'7.90"N	Agricultural land	Agricultural land	Nil	

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
52.	21/1	93°57'0.50"E 26°18'18.20"N	Government land	Agricultural land	Nil	Village road
53.	21/2	93°57'0.60"E 26°18'27.90"N	Government land	Agricultural land	Nil	
54.	AP-22	93°57'0.70"E 26°18'37.90"N	Government land	Agricultural land	Pond	Village road
55.	22/1	93°56'55.30"E 26°18'47.50"N	Agricultural land	Agricultural land		
56.	AP-23	93°56'50.30"E 26°18'56.30"N	Government land	Agricultural land	Nil	Village road
57.	23/1	93°56'51.90"E 26°19'4.60"N	Government land	Agriculture & non agriculture land	Nil	
58.	AP-24	93°56'53.60"E 26°19'13.70"N	Agricultural land	Agricultural land	Nil	Village road
59.	AP-25	93°56'51.20"E 26°19'25.10"N	Government land	Agricultural land	Nil	
60.	AP-26	93°57'0.20"E 26°19'33.40"N	Agricultural land	Agricultural land	Nil	Village road
61.	26/1	93°57'6.40"E 26°19'42.80"N	Agricultural land	Agricultural land	Nil	
62.	26/2	93°57'12.20"E 26°19'51.60"N	Agricultural land	Agricultural land	Nil	Village road
63.	AP-27	93°57'17.70"E 26°19'60.00"N	Agricultural land	Agricultural land	Pond	
64.	27/1	93°57'15.40"E 26°20'8.80"N	Agricultural land	Agricultural land	Nala	Village road
65.	27/2	93°57'13.00"E 26°20'18.20"N	Government land	Agricultural land		
66.	AP-28	93°57'10.70"E 26°20'27.10"N	Agricultural land	Agricultural land	Nil	Metal road
67.	28/1	93°57'11.90"E 26°20'38.00"N	Agricultural land	Agricultural land	Pond	
68.	AP-29	93°57'12.90"E 26°20'48.10"N	Agricultural land	Agricultural land		---
69.	AP-30	93°57'21.80"E 26°20'56.00"N	Agricultural land	Agricultural land	Pond	Village road
70.	AP-31	93°57'21.60"E 26°21'8.50"N	Agricultural land	Agricultural land		
71.	31/1	93°57'20.50"E 26°21'19.40"N	Agricultural land	Agricultural land	Nil	---
72.	AP-32	93°57'19.40"E 26°21'29.90"N	Agricultural land	Agricultural land	Nil	---
73.	32/1	93°57'19.70"E 26°21'41.60"N	Agricultural land	Agricultural land	Nil	---
74.	AP-33	93°57'20.00"E 26°21'53.10"N	Agricultural land	Agricultural land	Nala	Metal road
75.	33/1	93°57'28.40"E 26°21'58.30"N	Agricultural land	Agricultural land		
76.	AP-34	93°57'38.20"E 26°22'4.40"N	Agricultural land	Agricultural land	Nil	Metal road
77.	34/1	93°57'46.00"E 26°22'12.10"N	Agricultural land	Agricultural land	Nil	RCC road
78.	AP-35	93°57'53.10"E 26°22'19.10"N	Agricultural land	Agricultural land	Nil	
79.	35/1	93°58'3.30"E 26°22'22.90"N	Agricultural land	Agricultural land	Dhansiri river,	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
80.	AP-36	93°58'18.40"E 26°22'28.50"N	Agricultural land	Agricultural land	pond	Village road
81.	36/1	93°58'28.20"E 26°22'34.90"N	Agricultural land	Agricultural land	Nil	Village road
82.	AP-37	93°58'36.80"E 26°22'40.40"N	Agricultural land	Agricultural land	Nil	
83.	AP-38	93°58'38.50"E 26°22'51.40"N	Government land	Agricultural land	Nil	---
84.	38/1	93°58'34.50"E 26°23'0.50"N	Government land	Agricultural land	Pond	---
85.	AP-39	93°58'30.50"E 26°23'9.50"N	Government land	Agricultural land		Metal road
86.	AP-40	93°58'30.40"E 26°23'19.50"N	Government land	Agricultural land	Nil	
87.	AP-41	93°58'24.20"E 26°23'26.40"N	Government land	Agricultural land	Nil	Metal road
88.	AP-42	93°58'23.00"E 26°23'37.20"N	Tea garden land	Tea garden land	2 Nos Nala, Pond	
89.	AP-43	93°58'30.20"E 26°23'45.60"N	Government land	Agriculture & non agriculture land		Village road
90.	43/1	93°58'30.60"E 26°23'56.10"N	Tea garden land	Tea garden land	Pond	Tea garden road
91.	AP-44	93°58'31.00"E 26°24'7.00"N	Tea garden land	Tea garden land	Nil	
92.	44/1	93°58'38.50"E 26°24'15.50"N	Tea garden land	Tea garden land	Nil	
93.	44/2	93°58'46.00"E 26°24'24.00"N	Tea garden land	Tea garden land	Nil	
94.	AP-45	93°58'53.50"E 26°24'32.40"N	Tea garden land	Tea garden land	Nil	
95.	45/1	93°58'52.40"E 26°24'40.50"N	Tea garden land	Tea garden land	2 Nos Nala	Metal road
96.	AP-46	93°58'50.90"E 26°24'51.30"N	Tea garden land	Tea garden land		
97.	AP-47	93°58'45.70"E 26°24'59.40"N	Tea garden land	Tea garden land	Nala	---
98.	AP-48	93°58'39.10"E 26°25'4.90"N	Tea garden land	Tea garden land	Nala	Tea garden road
99.	48/1	93°58'38.20"E 26°25'14.70"N	Tea garden land	Tea garden land	2 Nos Pond	
100.	48/2	93°58'37.40"E 26°25'24.90"N	Tea garden land	Tea garden land		Tea garden road
101.	48/3	93°58'36.50"E 26°25'35.40"N	Tea garden land	Tea garden land		
102.	48/4	93°58'35.60"E 26°25'46.00"N	Tea garden land	Tea garden land	Nil	Tea garden road
103.	48/5	93°58'34.90"E 26°25'54.90"N	Tea garden land	Tea garden land	Nil	
104.	48/6	93°58'34.00"E 26°26'5.60"N	Tea garden land	Tea garden land	Nil	
105.	48/7	93°58'33.10"E 26°26'15.60"N	Tea garden land	Tea garden land	Nil	
106.	AP-49	93°58'32.30"E 26°26'24.90"N	Tea garden land	Tea garden land	Nil	
107.	AP-50	93°58'26.50"E 26°26'29.90"N	Tea garden land	Tea garden land	Nil	

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
108.	AP-51	93°58'20.00"E 26°26'34.30"N	Agricultural land	Agricultural land	Nala	Village road, Metal road
109.	AP-52	93°58'10.60"E 26°26'35.70"N	Agricultural land	Agricultural land		
110.	52/1	93°58'9.80"E 26°26'37.60"N	Agricultural land	Agricultural land	Pond	---
111.	52/2	93°58'9.20"E 26°26'38.80"N	Agricultural land	Agricultural land		---
112.	AP-53	93°58'7.20"E 26°26'43.50"N	Agricultural land	Agricultural land	Pond	Village road
113.	AP-54	93°58'6.00"E 26°26'53.00"N	Government land	Agricultural land		
114.	54/1	93°57'59.90"E 26°27'2.40"N	Government land	Agricultural land	Nil	---
115.	54/2	93°57'54.20"E 26°27'11.30"N	Government land	Agricultural land	Nil	---
116.	54/3	93°57'48.70"E 26°27'19.80"N	Government land	Agricultural land	Nil	---
117.	AP-55	93°57'43.00"E 26°27'28.60"N	Government land	Agricultural land	Nil	Un metal road
118.	55/1	93°57'41.20"E 26°27'39.20"N	Agricultural land	Agricultural land	Nil	
119.	55/2	93°57'39.80"E 26°27'47.90"N	Agricultural land	Agricultural land	Drain	---
120.	AP-56	93°57'38.30"E 26°27'56.70"N	Agricultural land	Agricultural land		---
121.	AP-57	93°57'42.60"E 26°28'1.30"N	Agricultural land	Agricultural land	Nil	Metal road
122.	AP-58	93°57'50.70"E 26°28'6.00"N	Agricultural land	Agricultural land	Nil	
123.	58/1	93°57'51.20"E 26°28'14.40"N	Government land	Agricultural land	Nil	---
124.	AP-59	93°57'51.80"E 26°28'22.90"N	Government land	Agricultural land	Nil	---
125.	AP-60	93°57'49.20"E 26°28'33.00"N	Agricultural land	Agricultural land	Nil	---
126.	60/1	93°57'48.40"E 26°28'43.70"N	Tea garden land	Tea garden land	Nil	---
127.	60/2	93°57'47.60"E 26°28'54.60"N	Tea garden land	Tea garden land	Nil	Tea garden road
128.	60/3	93°57'47.00"E 26°29'3.70"N	Tea Garden land	Tea garden land	Nil	
129.	AP-61	93°57'46.30"E 26°29'13.80"N	Tea Garden land	Agricultural land	Pond	
130.	AP-62	93°57'36.00"E 26°29'20.20"N	Government land	Agricultural land		---
131.	AP-63	93°57'23.60"E 26°29'19.00"N	Agricultural land	Agricultural land	Dhansiri river	Metal road
132.	AP-64	93°57'9.50"E 26°29'13.10"N	Agricultural land	Agricultural land		
133.	64/1	93°56'58.40"E 26°29'17.40"N	Agricultural land	Agricultural land	Nala	---
134.	64/2	93°56'48.20"E 26°29'21.40"N	Agricultural land	Agricultural land	Nil	---
135.	64/3	93°56'37.20"E 26°29'25.80"N	Agricultural land	Agricultural land	Nil	---

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
136.	64/4	93°56'26.10"E 26°29'30.10"N	Agricultural land	Agricultural land	Nil	---
137.	AP-65	93°56'16.00"E 26°29'34.10"N	Agricultural land	Agricultural land	Nil	---
138.	65/1	93°56'5.30"E 26°29'35.30"N	Agricultural land	Agricultural land	Nil	---
139.	65/2	93°55'54.60"E 26°29'36.40"N	Agricultural land	Agricultural land	Nil	Un metal road
140.	AP-66	93°55'43.20"E 26°29'37.70"N	Agricultural land	Agricultural land	Nil	
141.	AP-67	93°55'33.70"E 26°29'30.80"N	Agricultural land	Agricultural land	Nil	---
142.	67/1	93°55'24.50"E 26°29'29.10"N	Agricultural land	Agricultural land	Pond	NH-39
143.	AP-68	93°55'17.00"E 26°29'27.80"N	Agricultural land	Agricultural land		
144.	68/1	93°55'7.20"E 26°29'23.90"N	Tea garden land	Tea garden land	Nil	---
145.	68/2	93°54'57.10"E 26°29'19.90"N	Tea garden land	Tea garden land	Nil	Metal road
146.	68/3	93°54'47.70"E 26°29'16.20"N	Agricultural land	Agricultural land	Nala	
147.	68/4	93°54'38.80"E 26°29'12.70"N	Agricultural land	Agricultural land		Cart track
148.	AP-69	93°54'28.90"E 26°29'8.80"N	Agricultural land	Agricultural land	Pond	Metal road
149.	AP-70	93°54'15.60"E 26°29'8.80"N	Agricultural land	Agricultural land		
150.	70/1	93°54'6.60"E 26°29'16.20"N	Agricultural land	Agricultural land	Nala	---
151.	70/2	93°53'58.00"E 26°29'23.20"N	Agricultural land	Agricultural land	Nil	---
152.	70/3	93°53'49.40"E 26°29'30.20"N	Tea garden land	Agricultural land	Nil	Village road
153.	70/4	93°53'40.70"E 26°29'37.30"N	Tea garden land	Tea garden land	Nala	
154.	70/5	93°53'31.70"E 26°29'44.60"N	Tea garden land	Tea garden land		Tea garden road
155.	70/6	93°53'24.20"E 26°29'50.70"N	Tea garden land	Tea garden land	Nil	
156.	70/7	93°53'15.20"E 26°29'58.00"N	Tea garden land	Tea garden land	Nil	
157.	AP-71	93°53'7.40"E 26°30'4.40"N	Tea garden land	Tea garden land	Nil	Metal road
158.	AP-72	93°53'1.50"E 26°30'12.90"N	Agricultural land	Agricultural land	Nil	
159.	72/1	93°52'55.70"E 26°30'22.50"N	Agricultural land	Agricultural land	Nil	---
160.	AP-73	93°52'50.90"E 26°30'30.40"N	Agricultural land	Agricultural land	Nil	---
161.	73/1	93°52'39.70"E 26°30'34.60"N	Agricultural land	Agricultural land	Nil	---
162.	73/2	93°52'28.50"E 26°30'38.70"N	Agricultural land	Agricultural land	Nala	---
163.	73/3	93°52'17.30"E 26°30'42.80"N	Agricultural land	Agricultural land		Metal 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
164.	73/4	93°52'6.10"E 26°30'46.90"N	Agricultural land	Agricultural land	Nil	Village road
165.	AP-74	93°51'55.10"E 26°30'51.00"N	Agricultural land	Agricultural land	Nala	
166.	74/1	93°51'44.30"E 26°30'53.30"N	Agricultural land	Agricultural land		Tea garden road
167.	AP-75	93°51'32.50"E 26°30'55.80"N	Agricultural land	Agricultural land	Nala, Pond	Tea garden road
168.	75/1	93°51'24.10"E 26°31'2.00"N	Agricultural land	Agricultural land		
169.	AP-76	93°51'13.70"E 26°31'9.50"N	Agricultural land	Agricultural land	Drain	Metal road
170.	76/1	93°51'3.20"E 26°31'12.90"N	Tea garden land	Tea garden land		Tea garden road
171.	76/2	93°50'52.90"E 26°31'16.10"N	Tea garden land	Tea garden land	Nil	
172.	76/3	93°50'42.50"E 26°31'19.40"N	Tea garden land	Tea garden land	Nil	
173.	76/4	93°50'32.60"E 26°31'22.50"N	Tea garden land	Tea garden land	Nil	
174.	76/5	93°50'22.40"E 26°31'25.80"N	Tea garden land	Tea garden land	Nala	
175.	76/6	93°50'12.10"E 26°31'29.00"N	Tea garden land	Tea garden land		
176.	76/7	93°50'2.60"E 26°31'32.00"N	Agricultural land	Agricultural land	Nala	Un metal road
177.	AP-77	93°49'51.20"E 26°31'35.60"N	Agricultural land	Agricultural land	Nil	Un metal road
178.	AP-78	93°49'41.40"E 26°31'42.90"N	Agricultural land	Agricultural land	Doigrang river	
179.	78/1	93°49'29.30"E 26°31'43.10"N	Tea garden land	Tea garden land		Village road
180.	78/2	93°49'17.40"E 26°31'43.40"N	Tea garden land	Tea garden land	Nil	Tea garden road
181.	78/3	93°49'5.80"E 26°31'43.60"N	Tea garden land	Tea garden land	Nil	
182.	AP-79	93°48'55.50"E 26°31'43.80"N	Tea garden land	Tea garden land	Nil	Metal road
183.	79/1	93°48'49.70"E 26°31'51.60"N	Tea garden land	Tea garden land	Nil	
184.	79/2	93°48'43.10"E 26°32'0.70"N	Tea garden land	Tea garden land	Nil	Tea garden road
185.	AP-80	93°48'36.90"E 26°32'9.20"N	Tea garden land	Tea garden land	Nil	
186.	80/1	93°48'36.90"E 26°32'19.90"N	Tea garden land	Tea garden land	Nil	---
187.	AP-81	93°48'36.90"E 26°32'30.80"N	Tea garden land	Tea garden land	5 Nos Nala	Tea garden road
188.	81/1	93°48'26.50"E 26°32'37.80"N	Tea garden land	Tea garden land		
189.	81/2	93°48'17.60"E 26°32'43.70"N	Tea garden land	Tea garden land	Nala	

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
190.	AP-82	93°48'8.70"E 26°32'49.70"N	Tea garden land	Tea garden land	Drain	Tea garden road
191.	AP-83	93°48'0.70"E 26°32'58.90"N	Tea garden land	Tea garden land	2 Nos Pond, 2 Nos Nala	
192.	83/1	93°47'56.90"E 26°33'9.30"N	Tea garden land	Tea garden land		Metal road
193.	83/2	93°47'53.00"E 26°33'19.60"N	Tea garden land	Tea garden land	2 Nos Nala	
194.	83/3	93°47'49.20"E 26°33'29.70"N	Tea garden land	Tea garden land	4 Nos Nala	
195.	83/4	93°47'45.50"E 26°33'39.60"N	Tea garden land	Tea garden land	3 Nos Nala	
196.	83/5	93°47'41.70"E 26°33'49.90"N	Tea garden land	Tea garden land	3 Nos Nala, Drain	Tea garden road
197.	AP-84	93°47'38.20"E 26°33'59.30"N	Tea garden land	Tea garden land	Drain, Nala	
198.	AP-85	93°47'27.40"E 26°34'5.20"N	Tea garden land	Tea garden land	Drain	
199.	AP-86	93°47'19.80"E 26°34'6.40"N	Tea garden land	Tea garden land	Drain	
200.	Bay	93°47'15.7"E 26°34'6.5"N	Tea garden land	Tea garden land	Nil	---

Source: Detailed Survey report

It is evident from the above table that,

- The transmission line passes through the agriculture / crops, Tea Garden, trees / vegetation, built up and water bodies.
- No major settlements and cultural heritage within 100 m distance from the center line of RoW of transmission line;
- Most of the transmission towers will be access through village roads, tea garden road and cart tracks.

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.

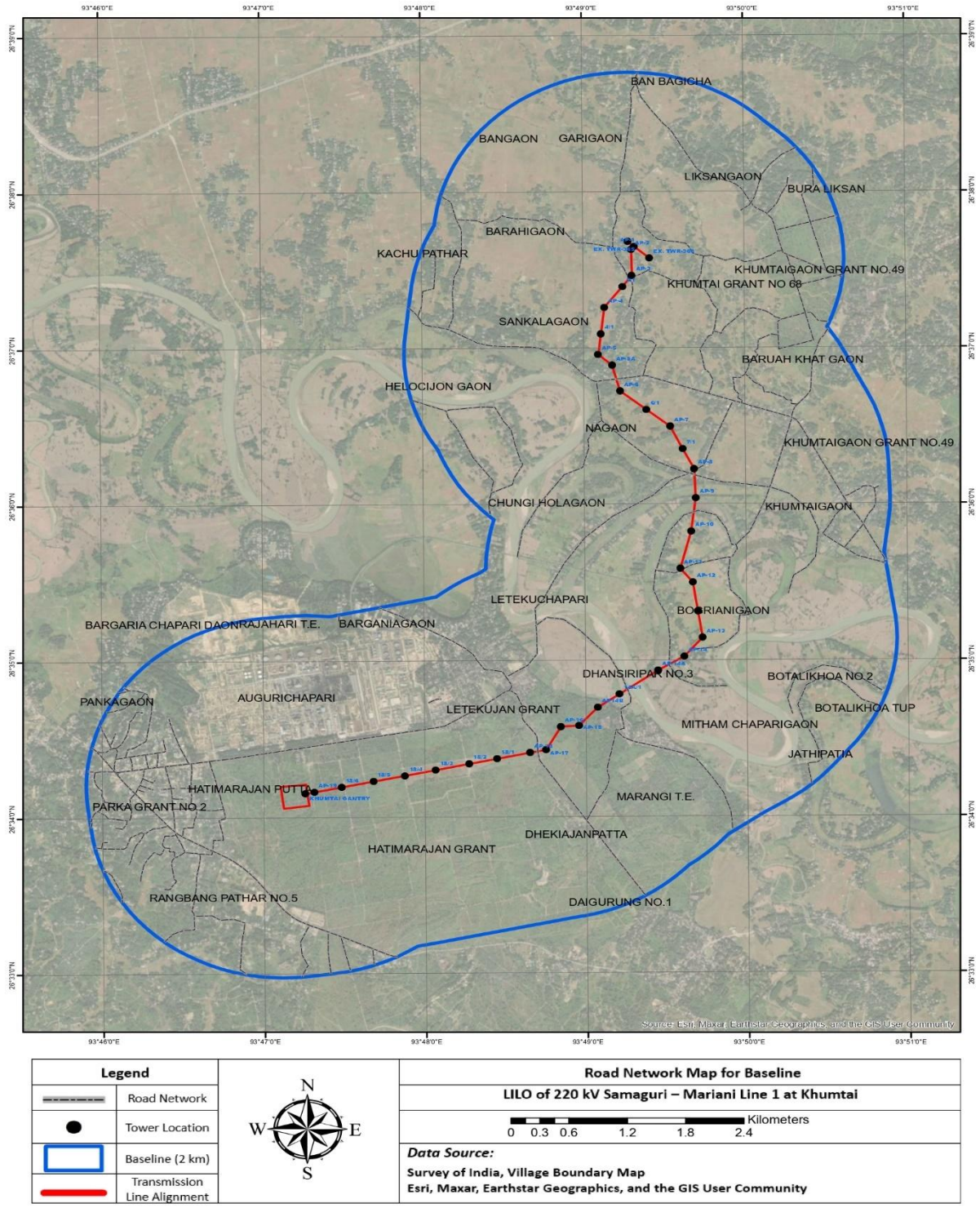


Figure 2.3 A: Map showing road network in area of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

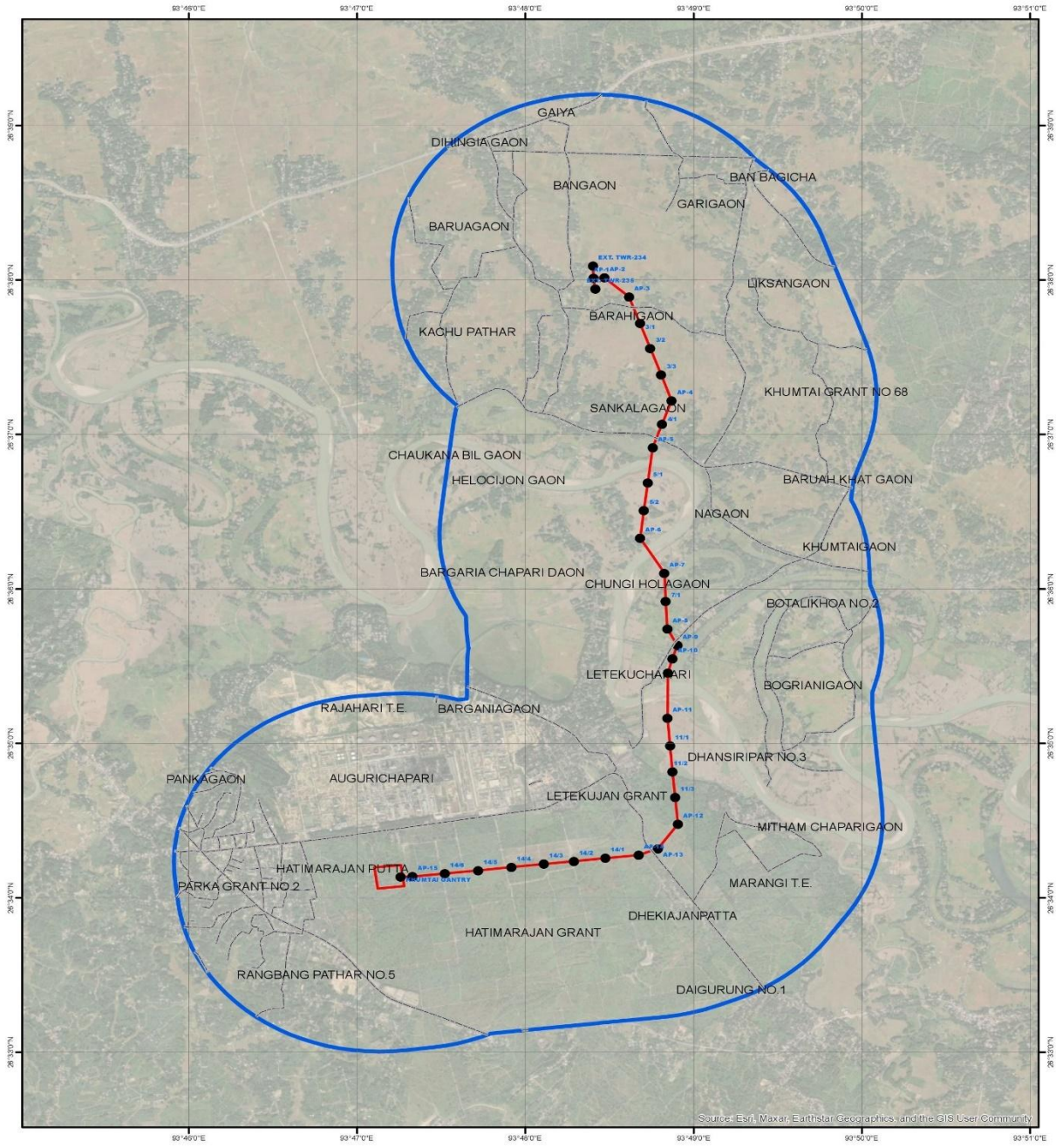


Figure 2.3 B - LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

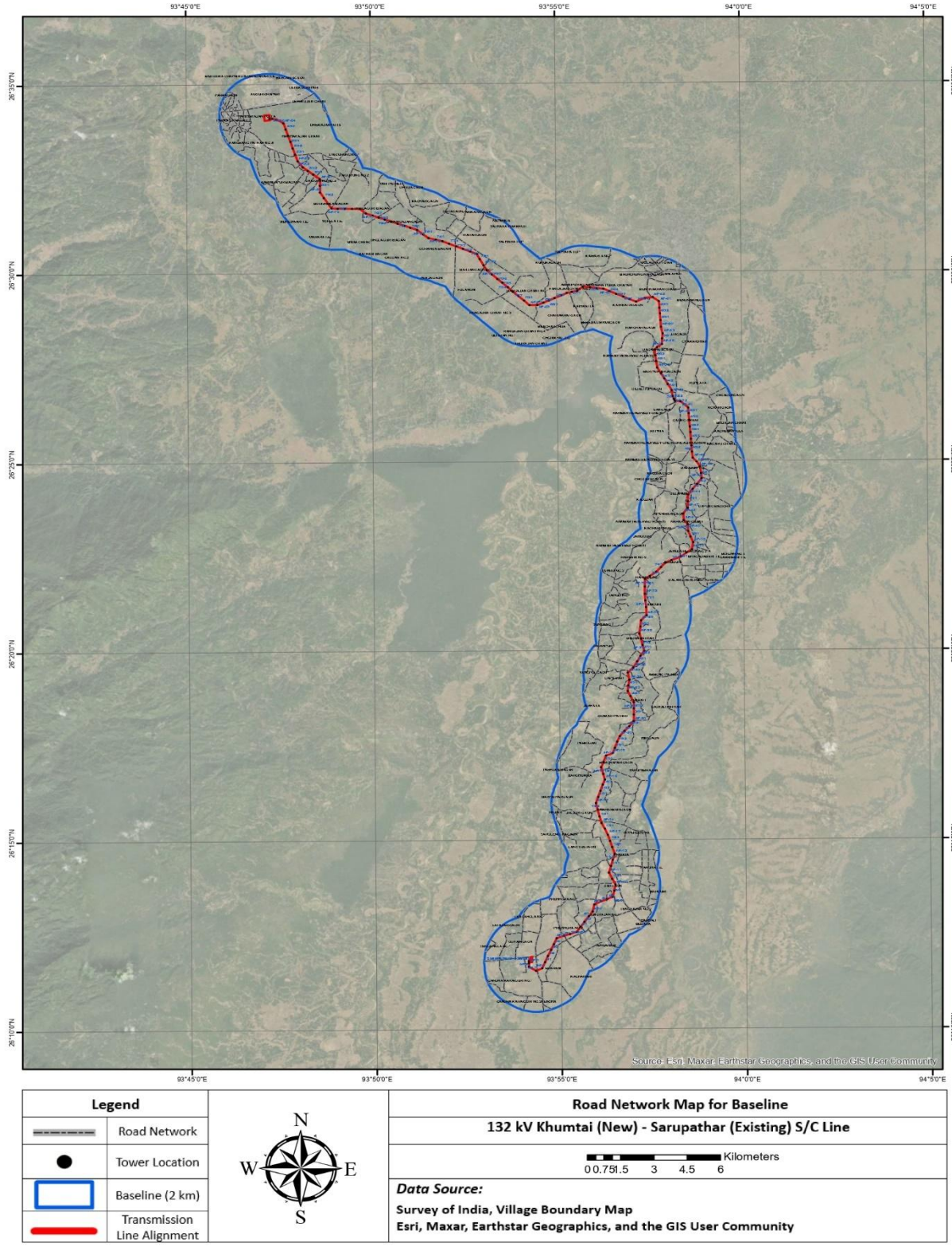


Figure 2.3 C - Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

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 2.5: 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 27 & 35 m for 132kV & 220kV respectively including both sides from the centre line of the transmission line. The Tower location will be identied on the ground in accordance with the line route during Check Survey. Tree enumeration will be finalized as per the Corridor ROW.
Clearing of Towering 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

Activity	Details
	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 Corncerned Field Officer jointly with the Contractor for foundation and tower footing / protection work, towers and tower accessories, earthing, Conductor, Insulators, Earthwires, RoW & Clearances.
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 carring 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 Survey report

Operation and Maintenance Phase

EPC contractor is obligated to address any issues arises during defect liability period as per the contract terms. AEGCL will perform required Operation and Maintenance after final handover by EPC contractor. Following are activities to be fermormed during operation period.

Table 2.6: Brief on Operation Activities

Activity	Details
Transmission Lines	
Ground inspection by lineman / team	For 220 kV and 132 kV T/Ls
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/Ls
Punctured insulator detection	Lines having insulator de-capping incidents.
Attending all Defects	Foundation- backfilling / soil removal, crack of chimney, tree

Activity	Details
	trimming, cleaning of insulators etc.

Source: Detailed 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.

2.5 Land requirement and allotment process

2.6 Land requirement

The land requirement for the transmission lines is comprised primarily of the following:

- Land required for the 35 numbers of transmission line towers for 220kV LILO Samaguri - Mariani Transmission Line, 33 numbers of transmission line towers for Jorhat to West Bokakhat transmission line and 200 numbers of transmission line towers for Khumtai to Sarupathar.
- The RoW corridor for the 220kV LILO of Samaguri - Mariani transmission line will be 35 m (17.5 m on each side of the transmission line route) for the length of 10.167 km and will cover approx. 355845 sq. m of land i.e. 35.5845 hectare.
- The RoW corridor for Jorhat to West Bokakhat transmission line route is 27 m (13.5 m on each side of the transmission line route) for the length of 10.198 km will cover approx. 275346 sq.m of land i.e. 27.54 hectare.
- The RoW for the Khumtai - Sarupathar transmission line route is 27 m (13.5 m on each side of the transmission line route) for the length of 61.205 km. The RoW corridor for the Khumtai to Sarupathar transmission line will cover approx. 1652535 sq.m of land i.e 165.25 hectare.
- The land for the 220kV LILO of Samaguri - Mariani transmission line tower base is comprised of land from five villages namely Helochi gaon, Khumtai- Nagaon, Leteku Chapori, Gandhi Gaon and Khumtai. The base area for the transmission line towers for DA type towers is approx. 35 to 51 sqm., DB type towers is approx. 47 to 66 sqm., DC type towers is approx. 50 to 70 sqm. and DD type towers is approx. 57 to 79 sqm.
- The land for the 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line tower base is comprised of land from four villages, namely Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai.
- The base area for the transmission line towers for DA type towers 31 to 45 sqm, DB type towers 37 to 53 sqm, DC type towers 41 to 61 sqm and DD type towers 47 to 70 sqm.
- The land for the 132 kV Khumtai to Sarupathar transmission line tower base is comprised of land from 31 villages, namely Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai.

The ground area for the Khumtai - Sarupathar transmission line towers for DA type towers 31 to 45 sqm, DB type towers 37 to 53 sqm, DC type towers 41 to 61 sqm and DD type towers 47 to 70 sqm.

Details of the land requirement for the 27m Right of Way (RoW) for the 132 kV D/C Khumtai to Sarupathar Transmission line, Jorhat to West Bokakhat Line and 35m RoW for the 220kV LILO of Samaguri - Mariani at Khumtai Transmission Line.

Table 2.7: Summary of Land Requirement for Project (220kV LILO of Samaguri - Mariani at Khumtai Transmission Line)

Project Sub Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
Transmission line RoW (Corridor Width of 35m)	Helochi gaon, Khumtai- Nagaon, Leteku Chapori, Gandhi Gaon and Khumtai	35.58	Landowner identification for RoW is under process
Base area for Tower footing	Helochi gaon, Khumtai- Nagaon, Leteku Chapori, Gandhi Gaon and Khumtai	0.16	Landowner identification for Tower base area is under process

Source: Detailed Survey report

Table 2.8: Summary of Land Requirement for 132kV LILO of Jorhat (W)- Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

Project Sub Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
Transmission line RoW (Corridor Width of 27m)	Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai	27.53	Landowner identification for RoW is under process
Base area for Tower footing	Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai	0.15	Landowner identification for Tower base area is under process

Source: Detailed Survey report

Table 2.9: Summary of Land Requirement for 132 kV D/C Khumtai to Sarupathar Transmission line

Sub Project Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
Transmission line RoW Corridor (Width of 27m)	Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai	165.25	Landowner identification for RoW is under process
Base area for Tower footing	Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari,	0.85	Landowner identification for Tower base area is under process

Sub Project Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
	Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai		

Source: Detail survey report

The check survey & Joint verification for identification of land owners for the all three numbers of proposed transmission line RoW, as well as tower footing is under process. After finalization of the land scheduling report the same would be provided in ARAP report.

2.7 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.

- **The Electricity Act, 2003, Part-VIII, Section 67 & 68**

  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, oracross, 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 a spossible, 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 ofIndia (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 Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024), 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, 2023 read with Section10 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 2.10: 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 Aadhaar card/Voter ID/or other valid identity card, Bank details as per UID, Jamabandi copy/ Khajana receipt, next to kin certificate (where required), NOC for land use, etc.

- Further, PIU to communicate to all stockholders/departments for providing various government rates for compensation of crop damage, plantation damage, tree cutting, trimming, utilities, etc. that will be damaged 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.

2.8 Costs and implementation schedule

2.9 Costs

A. Cost of 220kV D/C SAMAGURI-MARIANI CKT I LILO Transmission Line

Supply Portion – Rs. 75011693.91

Erection Portion – Rs. 33660698.38

B. Cost of 132kV D/C JORHAT WEST- BOKAKHAT LILO Transmission Line

Supply Portion – Rs. 68396174.12

Erection Portion – Rs. 39306565.59

C. Cost of 132kV D/C Khumtai – Sarupathar Transmission Line

Supply Portion – Rs. 270467113.72

Erection Portion – Rs. 130429254.77

2.10 Implementation schedule

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

Bar Chart (Time Schedule)

Construction of 220/132kV;2X160 MVA, 132/33kV; 2x50MVA GIS at location (Khumtai) and its associated transmission lines and bay extension work (Package D)

SUPPLY ACTIVITY

CONTRACTUAL PERIOD : 36 Months | RS INFRAPROJECTS PVT LTD

Tender Specification:-AEGCL/MD/AIB/Package-D/2020/02-D

S.No.	Activity	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36
1	Foundation bolts, Towers & beams																																				
2	Equipment Structures																																				
3	Disc Insulators, Hardware clamps & Connectors																																				
4	AAC Tarantula conductor & Earthwire																																				
5	Earthing mat material																																				
6	GIS Equipment																																				
7	Control & relay Panels																																				
8	Battery & Battery Charger																																				
9	Power & control cable, ACDB, DCDB, MK																																				
10	Station Transformers																																				
11	Capacitor Banks																																				
12	Power Transformers																																				
13	Lighting Equipment																																				
14	Fire Fighting Equipment																																				

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2.11 Associated and existing facilities of the project

NRL is executing a major expansion project of capacity augmentation from present 3.0 MMTPA to. 9.0 MMTPA by installing a 6 MMTPA capacity. For uninterupted and reliable power supply, NRL is presently constructing a 220kV/132 S/s within the NRL campus. To connect this S/s from the AEGCL grid, 2 nos. 220kV cable line is being constructed by NRL which shall be connected to AEGCL Khumtai S/s.

Khumtai S/s which is presently under construction, shall connected to the 220kV grid S/s of AEGCL at Mariani and Samaguri and also connect 132kV Sarupathar S/s and 132kV Bokakhat S/s.
Apart from the above Extra High Voltage (EHV) line, to cater the power demand of the vicinity, 33kV distribution lines of APDCL shall also be terminated in Khumtai S/s.

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 requires 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 required. However, project associated activity	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				like creation of borrow area (if any), boulders, River Sand 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 / Central State Pollution Control Board (CPCB) / Pollution Control Board (PCB), Assam	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 compensation for damages to persons and property and for matters connected	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
		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 Department of Environment and Forest, Assam and MoEF & CC, New Delhi	Applicable, comply with applicable standards **(refer Appendix – 8)** for ambient air, air emission, effluents, receiving water bodies, and drinking water, soil quality 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	Department of Environment and Forest, Assam, IROGuwahati, MoEF& CC	Not Applicable, no notified forest land within the subproject area. As per detailed survey report 1175m length with 5 numbers towers (AP 33/0, AP 33/1, AP 34, AP 34/1 and 35/0) near village 1 no. Herhari village (1175m) comes under Dayang	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				Reserve Forest. In reply of the recent communication of AEGCL, Sarupathar Revenue Circle office confirmed that, tower no. AP 33, AP 33/1, AP 34 and AP 34/1 fall under 1 no. Herhari Gaon under Barpathar Mouza, in Saripathar Revenue Circle and not comes under Forest Land **(Appendix 1A).** Moreover, Golaghat Forest Division vide letter dated 23.08.2024 also confirmed that AP 33 to AP 34/1 does not falls within the Dayang Reserve Forest under Golaghat Division **(Appendix 1B).**	
8.	National Forest Policy 1988	It articulates the twin objectives of ecological stability and social justice; recognizes people's dependence 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.	Department of Environment and Forest, Assam, MoEF&CC, New Delhi	Not Applicable, no notified forest land within the subproject area.	-
9.	Assam Forest	This policy is to	Department of	Not Applicable	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	Policy, 2004	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.	Environment and Forest, Assam		
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 system, wildlife protection and infrastructure development	Department of Environment and Forest, Assam and MoEF&CC, New Delhi	Not Applicable, no notified forest land within the subproject area.	-
11.	The Assam Compensatory Afforestation Fund Rules, 1994	Provision to constitute a Fund for the purpose of Compensatory Afforestation to be raised against the	Department of Environment and Forest, Assam	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
		Forest Area diverted for non-forest use under the provisions of Section 4(1) of the Forest (Conservation) Act, 1980			
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 habitat. This Act prohibits destruction, exploitation or removal of any wildlife, and provides for protection to listed species of flora	Department of Environment and Forest, Assam, NBWL, SBWL	Not applicable as per MOEF&CC Notification dated 17 May 2022. Transmission Lines are not located within the boundaries of protected areas.	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		and fauna.			
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 provision of the Water (Prevention and Control of Pollution) Act of 1974.	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
18.	Wetland (Conservation and Management)	The Rules specify activities which are harmful and prohibited in the	Central Wetlands Regulatory Authority (CWRA)	Not Applicable, none of the T/L falls within notified wetland areas.	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	Rules, 2010, 2017	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.			
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 authorised 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
21.	Solid Waste Management Rules 2016	Rules for management of	State Pollution Control Board, Assam and Local	Applicable, follow all the rules in managing solid waste during	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
		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.	Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plans for its safe disposal/burial.	construction works activities	
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	State Pollution Control Board, Assam	Not Applicable	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		rule.			
24.	Central Motor Vehicle Rules, 1989	To minimize the road accidents, penalizing the guilty, provision of compensation to victim and family and check vehicular air and noise pollution.	Commissionerate of Transport (District Transport Offices, Assam)	Applicable during transportation of manpower and construction material. Also applicable during the use of construction equipment and vehicles.	EPC Contractor / PMC / AEGCL
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;	Assam State Disaster Management Authority (ASDMA)	The subproject areas fall under the seismic zone V and hence any construction	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
		mitigation measure to be integrated with development plans and projects; build capacity and preparedness measure; and specify roles and responsibilities to each dept. in relation to adopted measure.		activities/ interventions will be under purview of this act.	
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	The act aims to provide fair compensation to	State Revenue Department/ District	No Applicable asinvoluntary land acquisition is not	AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 Rights of Persons with Disabilities Act, 2016	landowners and ensure transparency in land acquisition processes. Additionally, it focuses on the rehabilitation and resettlement of affected persons. 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.	Administration Ministry of Social Justice & Empowerment/ Commissionerate of Labour, Government of Assam	trigered Yes. For all the sub-project where Persons with Disabilities are 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, oracross, 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	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 14.06.2024*)*	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
36.	Assam Government Power (Electricity)	Payment of compensation towards damages in regards to Right of	Assam Government Power (Electricity)	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
	Department, Dispur, Guwahati-6	Way for transmission lines	Department		
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 and other forest dwelling communities.	Department of Environment and Forest, Assam and District Administration	Not Applicable, no notified forest land within the subproject area	
39.	Direct Purchase Policy, 2023	In the States policy of Direct Purchase of land, the affected	Revenue & Disaster Management	Will not be trigger for the TL.	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		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.	(LR) Department, Govt. of Assam		
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.	Archaeological Survey of India (ASI), GoI	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
		Permission of the 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.	Commissionerate 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.	Commissionerate 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
44.	Employees State	Employees State Insurance Act	Commissionerate of Labour,	Applicable Should follow as per the	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
	Insurance Act, 1948	provides sickness benefit, maternity benefit (Female employees), disablement benefit, dependent's benefit and medical benefits as specify in the act to the employees.	Government of Assam	requirement of the Act,	/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.	Commissionerate 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	Commissionerate 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 where in 20 or more	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
		work.		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.	Commissionerate 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 (Abolition) Act	An Act to provide for the abolition of bonded labour system	Commissionerate of Labour, Government of	Applicable, Contractor will ensure that there is	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
	1976 Bonded Labour System (Abolition) Rules 1976	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	Assam	no Bonded Labour in the project.	
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	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
		of employment 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	No

Sl. No.	Conventions/Treaties/Declarations	Applicability to the project
	Hazardous Waste and Their Disposal, 1989	
6.	Rotterdam Convention on Prior Informed Consent (PIC) for certain Hazardous Chemicals and Pesticides in International Trade, 1998	No
C. Atmospheric emissions		
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	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.

	Worst Forms of Child Labour, 1999 (No. 182)	

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.

No land is acquired permanently for tower foundation & RoW, ownership of land will be remains with the owner and agricultural activities are allowed to continue after construction activity. However, compensation for tree and crop 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; Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) and Government of Assam Notification on land compensation for tower footing and RoW corridor on 10th March 2017.

ESS 2 will be evaluated after conducting check survey and accordingly Abbreviated Resettlement Action Plan (ARAP) will be prepared.

ESS 3: Indigenous Peoples

The ESS 3 is applicable if indigenous peoples are present in, or have a collective attachment to, the proposed area of the project, and are likely to be affected by the project. 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.

Assessment for requirement of ESS 3 will be conducted after check survey for all the three nos. of transmission lines and Indigenous People Plan (IPP) will be prepared accordingly.

B. Environmental and Social Exclusion List

AIIB decided not to finance Projects that it determines do not comply with the ESP and ESSs. The Bank will not knowingly finance a Project that: (a) either involves or results in forced evictions[1] ; 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.

[1] 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).

S. No	Category	Requirement of Assessment
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 to conduct 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

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 analyze 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 requires 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)[2]. As part of ADB funded projects, AEGCL has experience in development and management of E&S instruments per MDBs' requirements. AEGCL's working operation safety manual[3] also serves as its commitment towards fulfilling the E&S responsibilities including occupation health and safety.

[2]https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_Mo Us/2015/6/ESPPF_ASSAM.pdf

[3] 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 social environment baseline of the study area.

4.1 Location Characteristics

The project site is located in Khumtai, Sarupathar, Golaghat and Morongi of Golaghat district. The project footprint (RoW) is spread across following villages of three numbers of Transmission Lines namely:

A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line: Helochi Gaon, Khumtai-Nagaon, LetekuChapori, Gandhi Gaon, Khumtai.

B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line: Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai.

C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line: Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai.

The entire Project area for three transmission lines doesn't fall under scheduled area as defined by the Indian Constitution.

No Schedule area, national park, wildlife sanctuaries, biosphere reserves, notified historical and cultural sites etc. are falling in the entire Project area for three transmission lines. As per detailed survey report, 1175m length with 5 numbers towers (AP 33/0, AP 33/1, AP 34, AP 34/1 and 35/0) near village 1 no. Herhari village (1175m) comes under Dayang Reserve Forest as per detailed survey report. During ESIA-ESMP report preparation, as per the remote sensing database, it has been found that, 4 numbers of tower (AP 33/0, AP 33/1, AP 34, AP 34/1) comes under Dayang Reserve Forest, Golaghat Forest Division. In reply of the recent communication of AEGCL, Sarupathar Revenue Circle office confirmed that, tower no. AP 33, AP 33/1, AP 34 and AP 34/1 fall under 1 no. Herhari Gaon under Barpathar Mouza, in Saripathar Revenue Circle and not comes under Forest Land **(Appendix 1A)**. Moreover, Golaghat Forest Division vide letter dated 23.08.2024 also confirmed that AP 33 to AP 34/1 does not falls within the Dayang Reserve Forest under Golaghat Division **(Appendix 1B)**. The location of transmission line on toposheet with surrounding environmental and social features is given in **Figure 2.1 A, B & C.**

4.2 Study Area

The direct impacts from the project may be limited to the project footprint (RoW). Indirect/induced impacts to Area of Influence (AoI) which is considered as 2 km distance on both sides of Transmission line for the environmental and social base line and 10 km distance for assessing the flora and 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 268 numbers of transmission towers;

Stringing of conductors across the transmission line of 81.57 km length from temporary tapping point to substation (RoW of 27 m & 35 m);

Temporary access through government and private land for construction and

maintenance works inoperation phase;

Temporary use of vacant government land for storage of materials andequipment 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) which is considered as potential indirect and induced impacts of the Project and Project activities.

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 resources based on the following reach of 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) – 10 km in either side from centerline of transmission lines.

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

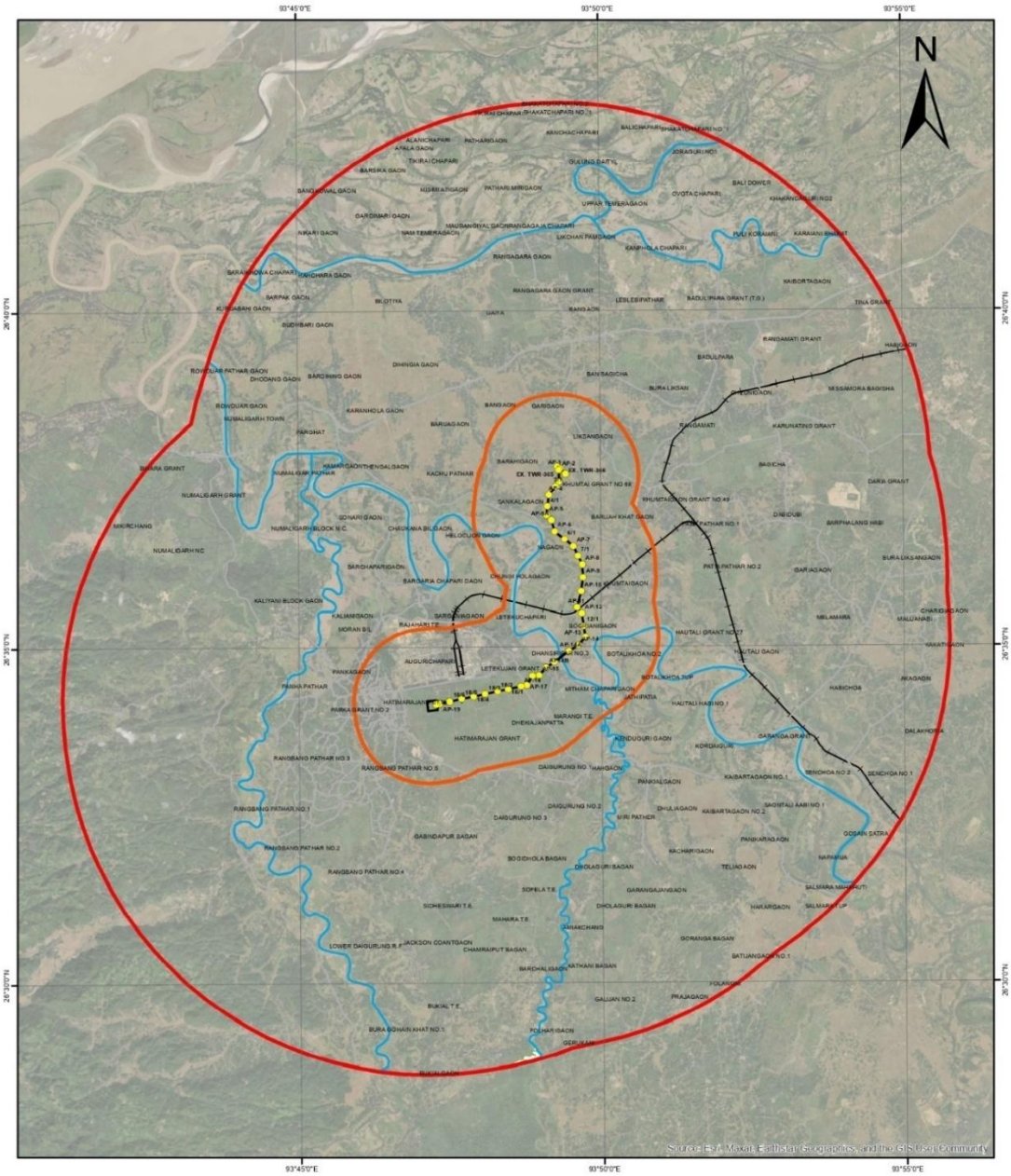
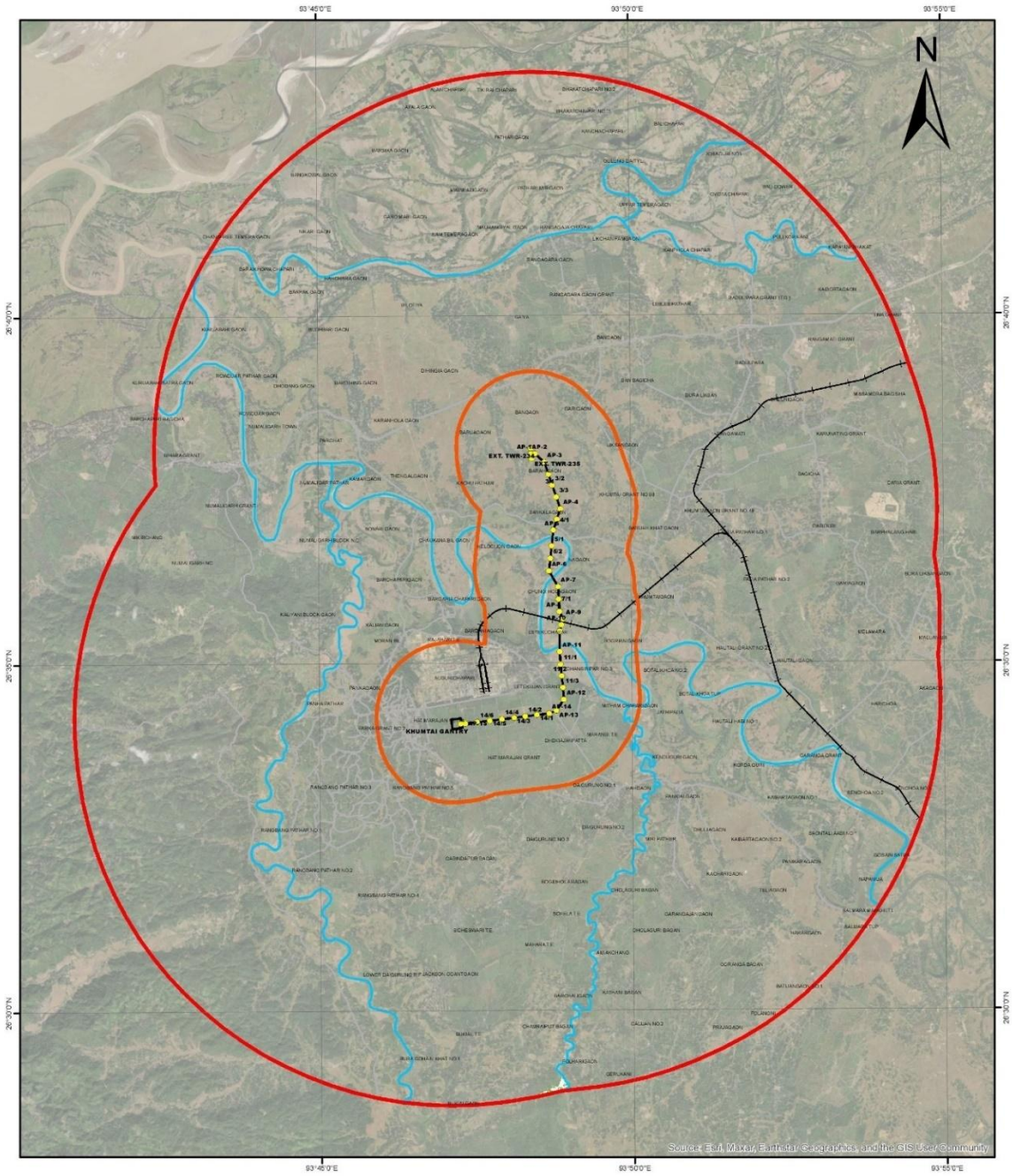


Figure 4.1 A: Study area map (RoW, 2 km and 10 km) of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line



Legend				Study Area Map for Baseline
	Study Area for Biological Environment for Baseline (10 km)		Reserved Forest	LILO of 132kV Jorhat (W) – Bokakhat (Existing) at Khumtai (New) S/C Line
			Tower Location	0 0.5 1 2 3 4 Kilometers
	Study Area for Physical Environment and Social Environment For Baseline (2 km)		Transmission Line Alignment	*Source:* *Assam Remote Sensing Application Centre, ASTE Council, Dpt. of Science & Technology, Govt. of Assam*
			Roads	*Survey of India, Village Boundary Map*
			River/Stream	*Esri, Maxar, Earthstar Geographics, and the GIS User Community*

Figure 4.1 B: Study area map (RoW, 2 km and 10 km) of LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

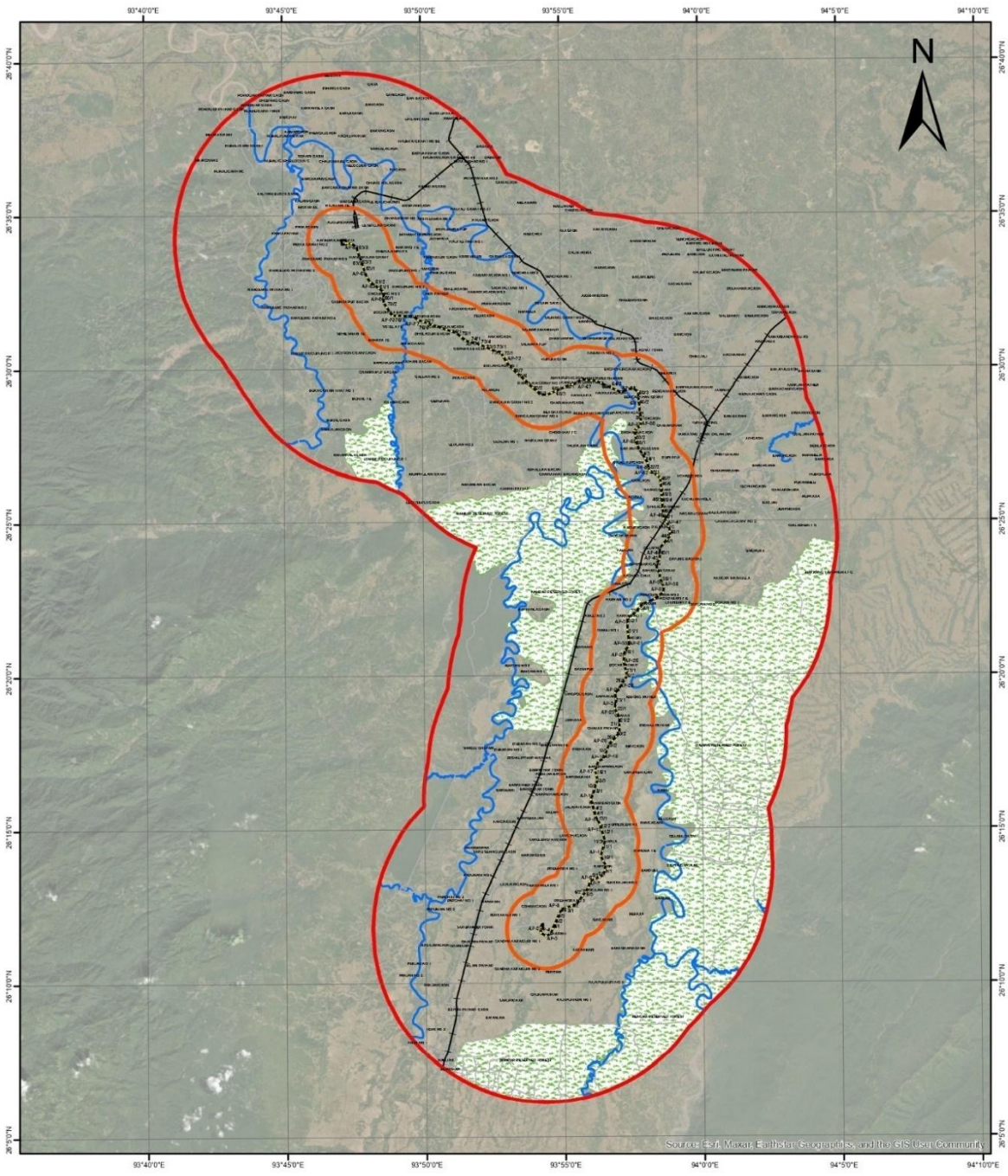


Figure 4.1 C: Study area map (RoW, 2 km and 10 km) of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

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 Kumtai S/s. Secondary data / information has been collected from reliable sources for geology, hydrology, landuse, meteorology, ecology and socio-economics.

Details of Biological Environment - Brief ecological surveys were carried out. Data of flora and fauna has been gathered from secondary sources, including AVISTEP whereas tree data used were gathered from detailed survey report of Transmission line.

Critical habitat assessment

As part of the Critical Habitat Assessment, Key Biodiversity Areas (KBA) were identified by obtaining data from The World Database of Key Biodiversity Areas. This data was then overlaid with the routes of the three proposed transmission lines to determine whether any KBA sites fall within or near the vicinity of these routes.

4.3 Physical Environment Baseline of the Study Area

4.3.1 Land use and Land cover

In the study area the land is primarily used for agriculture / crops (Tea Garden). The other land uses in the area are trees / vegetation, built up and water bodies. The land use map of the study area is presented in **Figure 4.2 A, B & C**. The details of the land use of transmission tower base and RoW of transmission line is provided in **Table 2.3.**

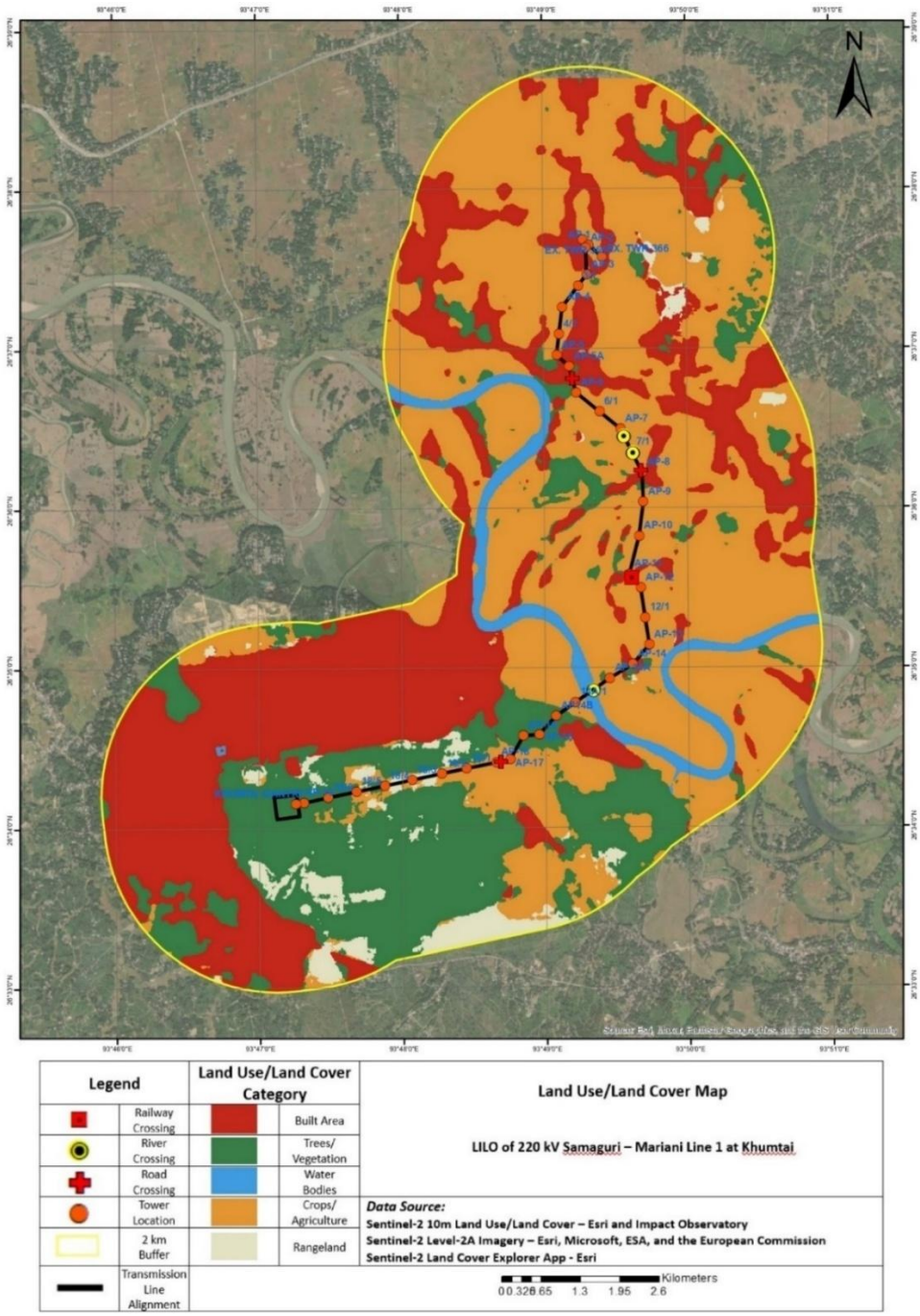


Figure 4.2 A: Land use and Land cover of study area of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

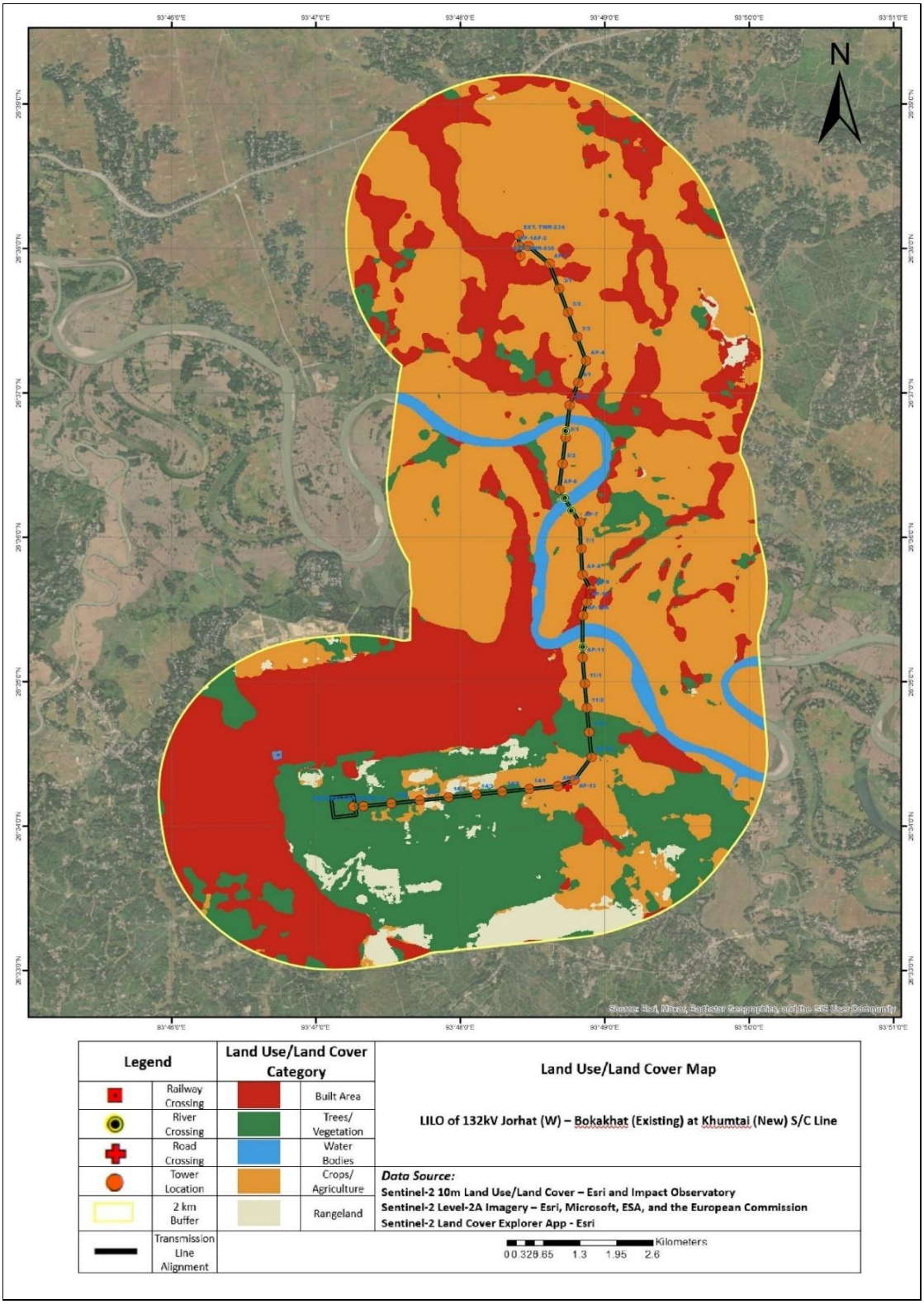


Figure 4.2 B: Land use and Land cover of stusdy area of LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

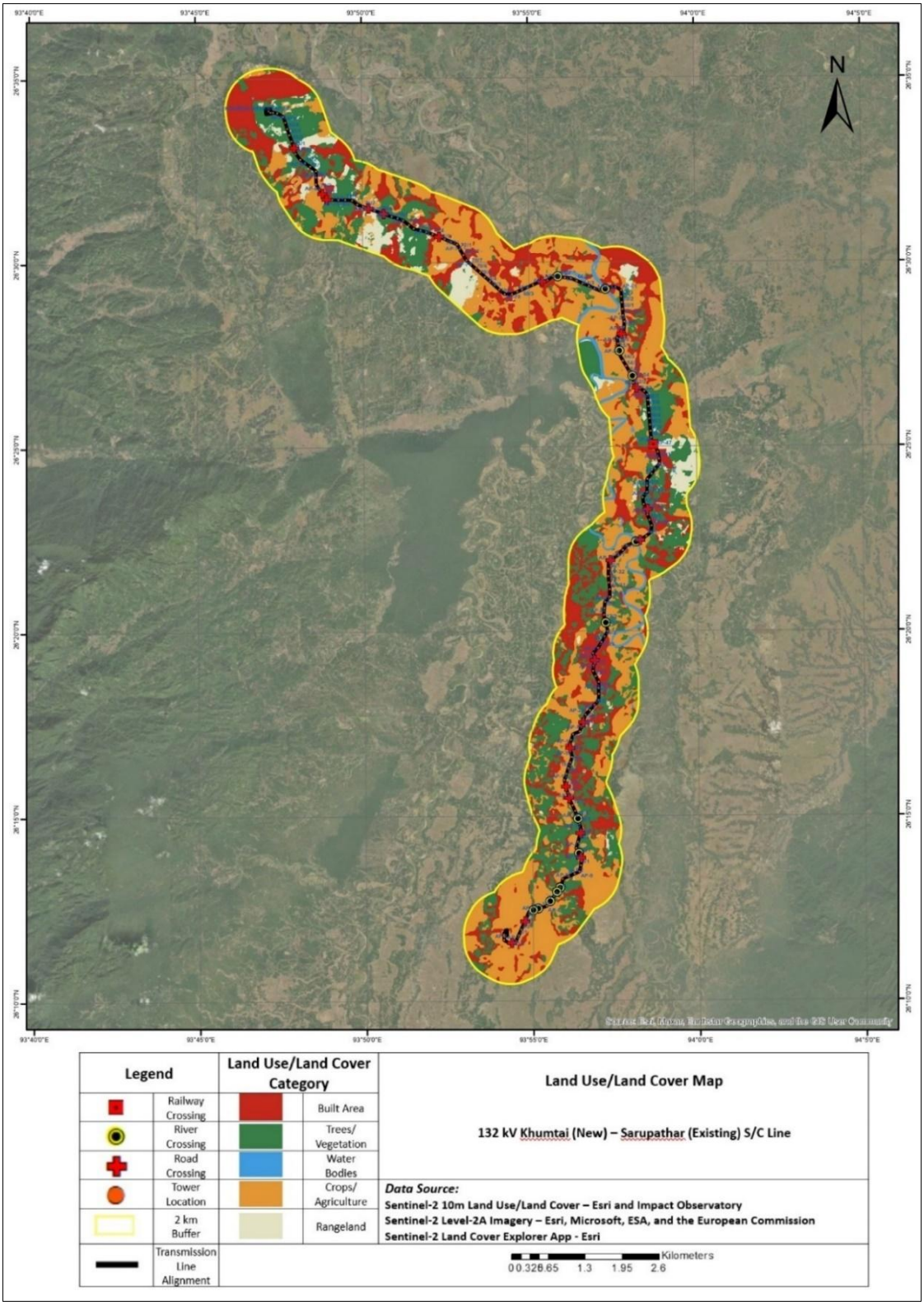


Figure 4.2 C: Land use and Land cover of study area of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

4.3.2 Topography and Terrain

Golaghat district shows a monotonous plain topography towards north and southeast, while the southwestern part of the area represents an undulating topography. The general elevation of the elevated area is around 100 meters above Mean Sea Level (MSL) and low-lying areas show altitude

about 80 m above MSL. Maximum height of about 128 m above MSL is observed in the southern parts of the district, where it merges with the hills of the Nagaland as well as Karbi-Anglong district of Assam. The slope of the district is towards northeast from south.

Mostly a plain/flat terrain has been found in the study area of transmission lines. Elevation of project corridor (i) LILO of 220 kV Samaguri – Mariani and (ii) LILO of 132 kV Jorhat (W)-Bokakhat is 26 to 75 m whereas (iii) 132 kV D/C Khumtai (AEGCL-New) – Sarupathar is 18 to 140 m respectively. The DEM map of the study area is presented in **Figure 4.3 A, B & C.**

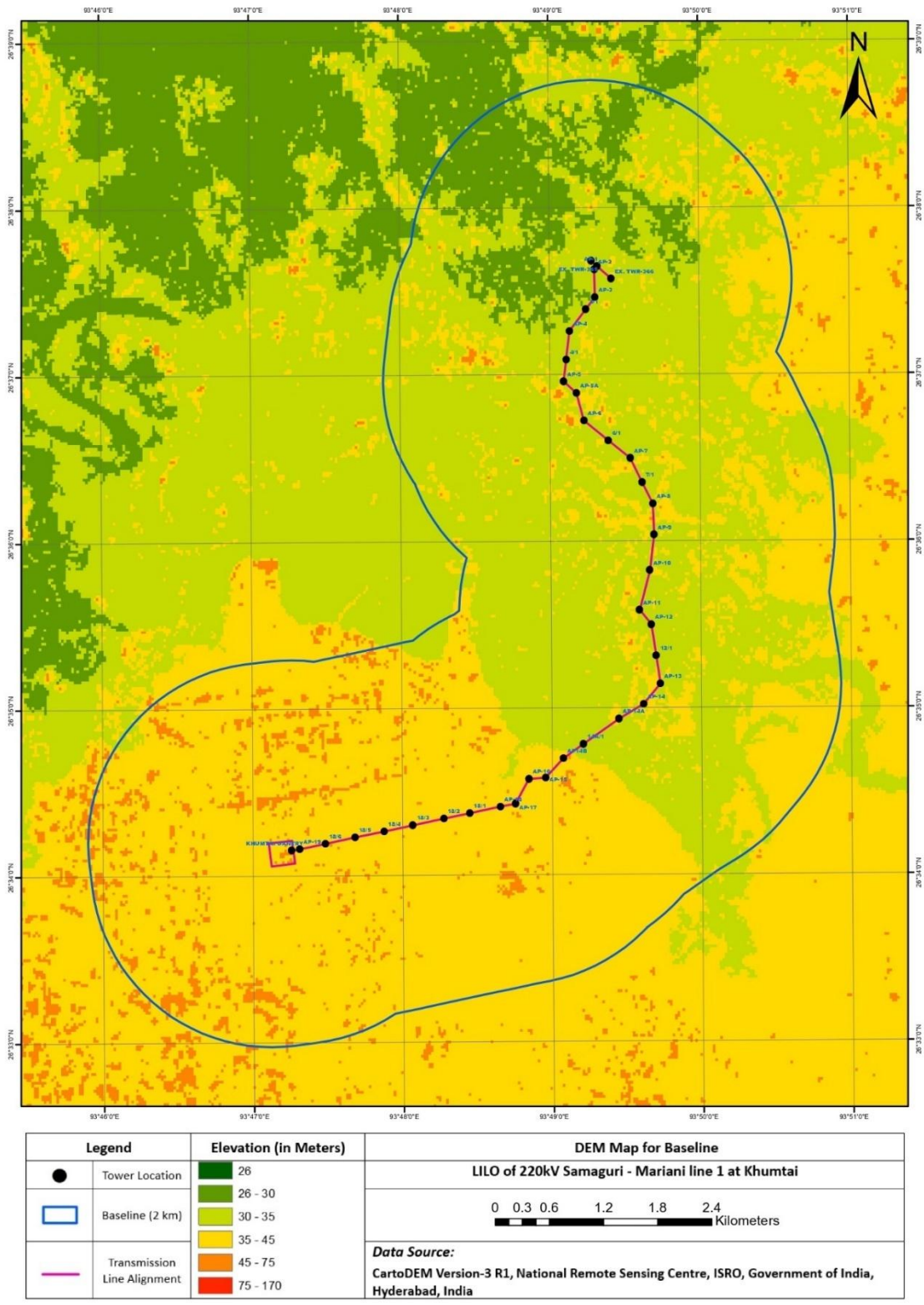


Figure 4.3 A: DEM map of the study area of LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

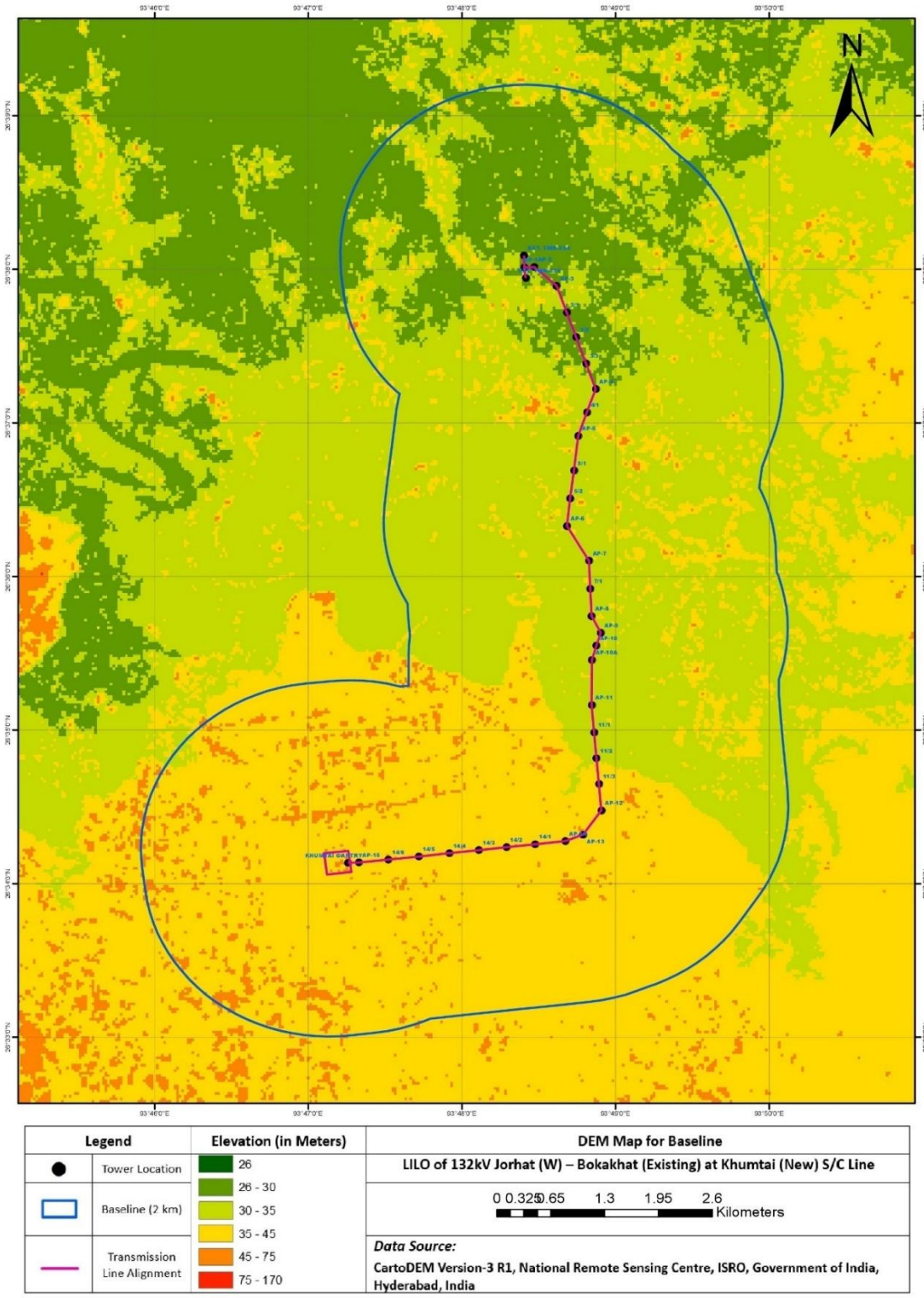


Figure 4.3 B: DEM map of the study area of LILO of 132 kV Jorhat (W) - Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

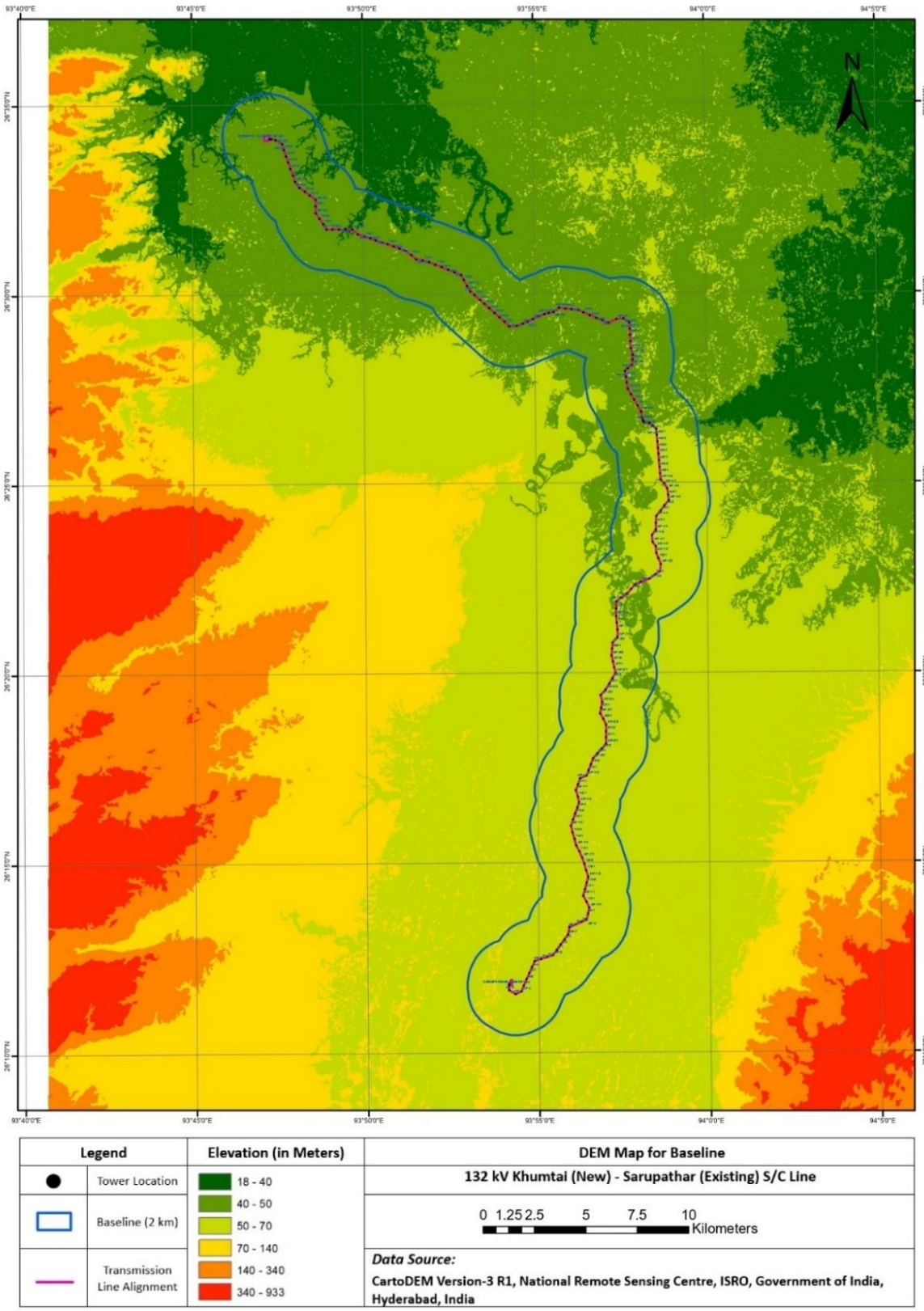


Figure 4.3 C: DEM map of the study area of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

4.3.3 Drainage

The drainage of Golaghat district is dominated by mighty Brahmaputra River which is flowing in east-west direction in the extreme northern parts of the district and its tributaries flowing in northern direction. The entire drainage system of the district plays an important role in the ground water occurrence and balance of the district. Important Rivers of the district are Dhansiri and Dayang. These rivers have meandering courses with abandoned channels in the form of water bodies and ox-bow lakes along their courses.

The RoW of all the three transmission lines passes through several water courses. Details are given in **Table 2.3.** Drainage map of the study area is given **Figure 4.4 A, B & C**.

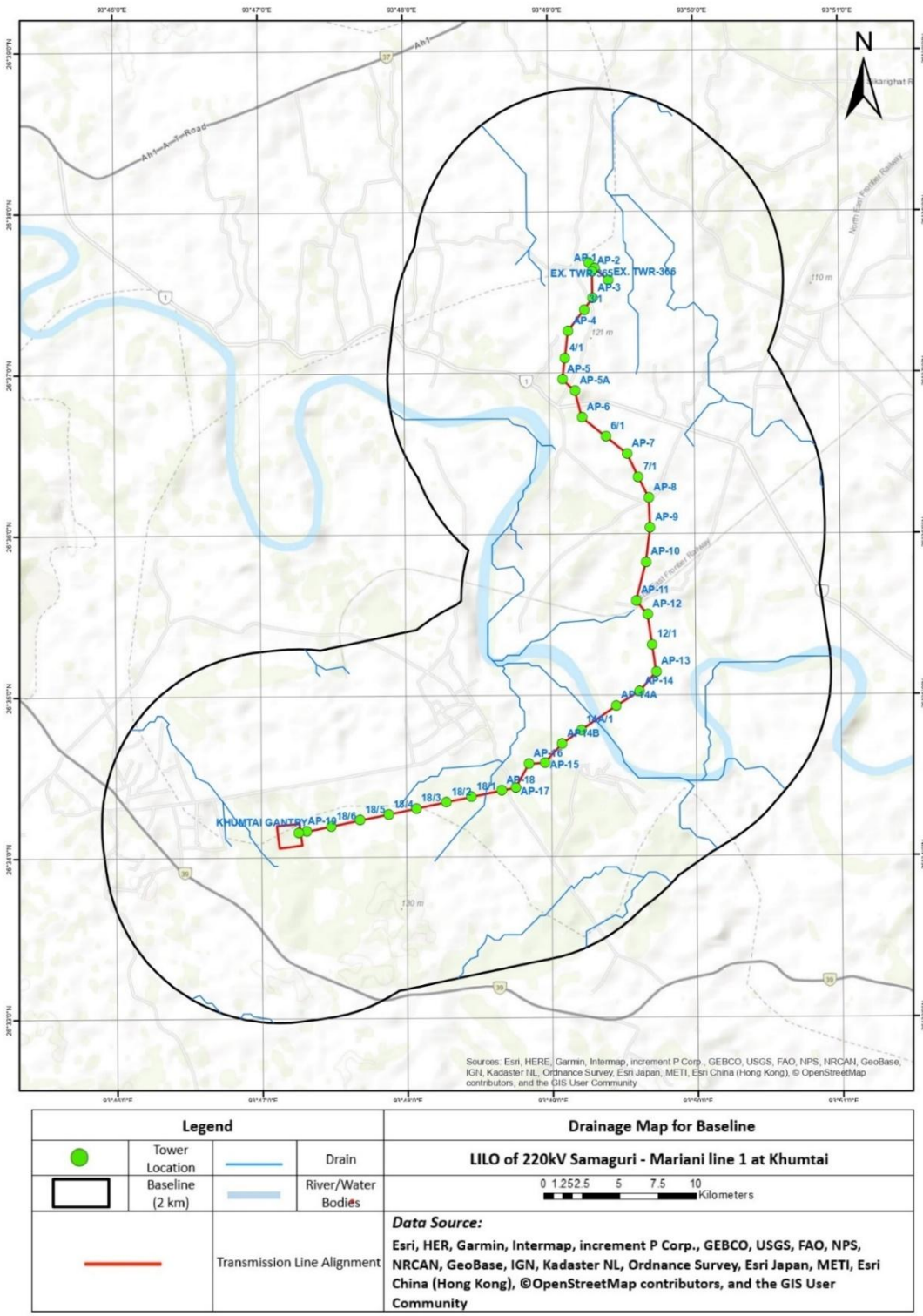
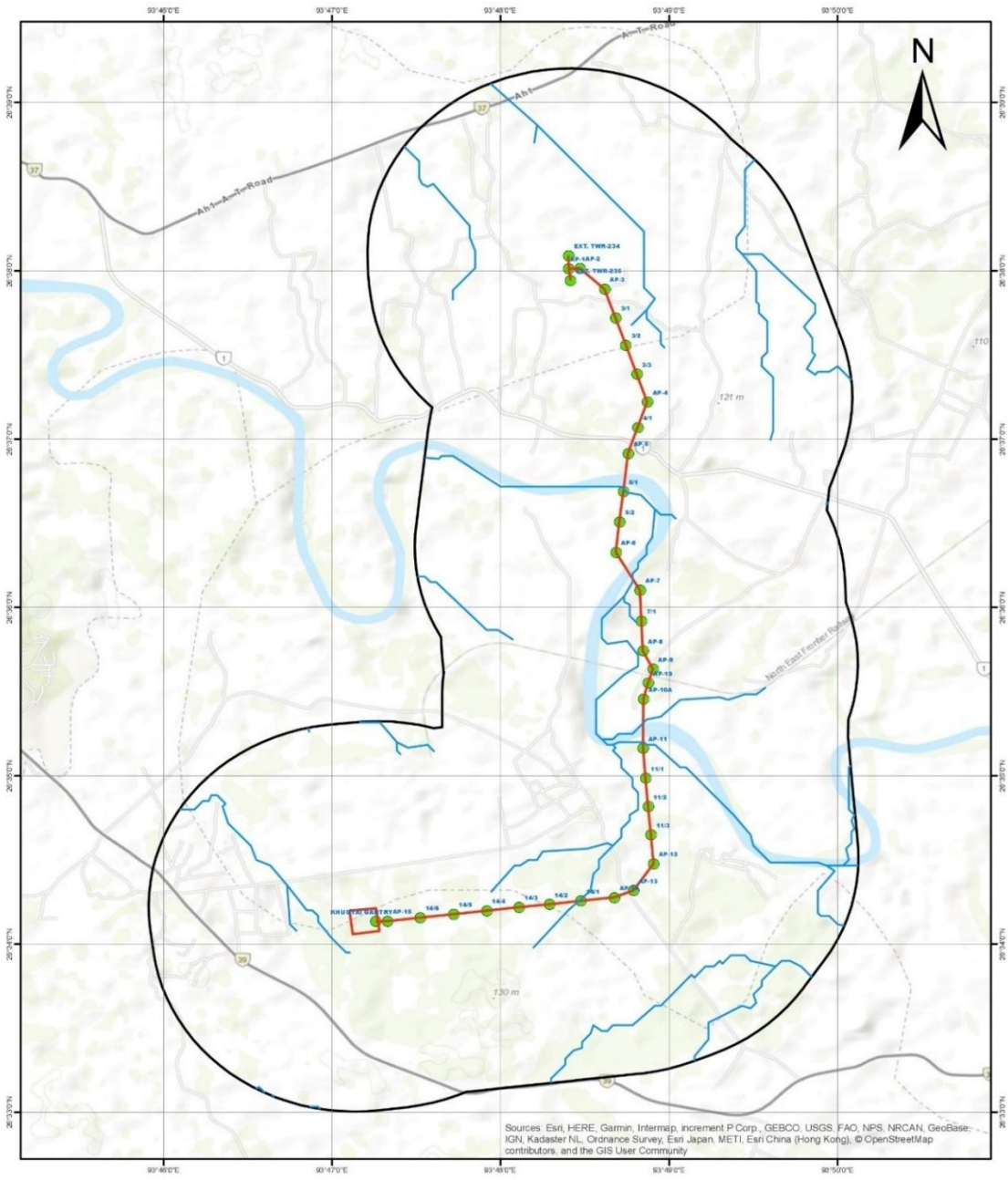
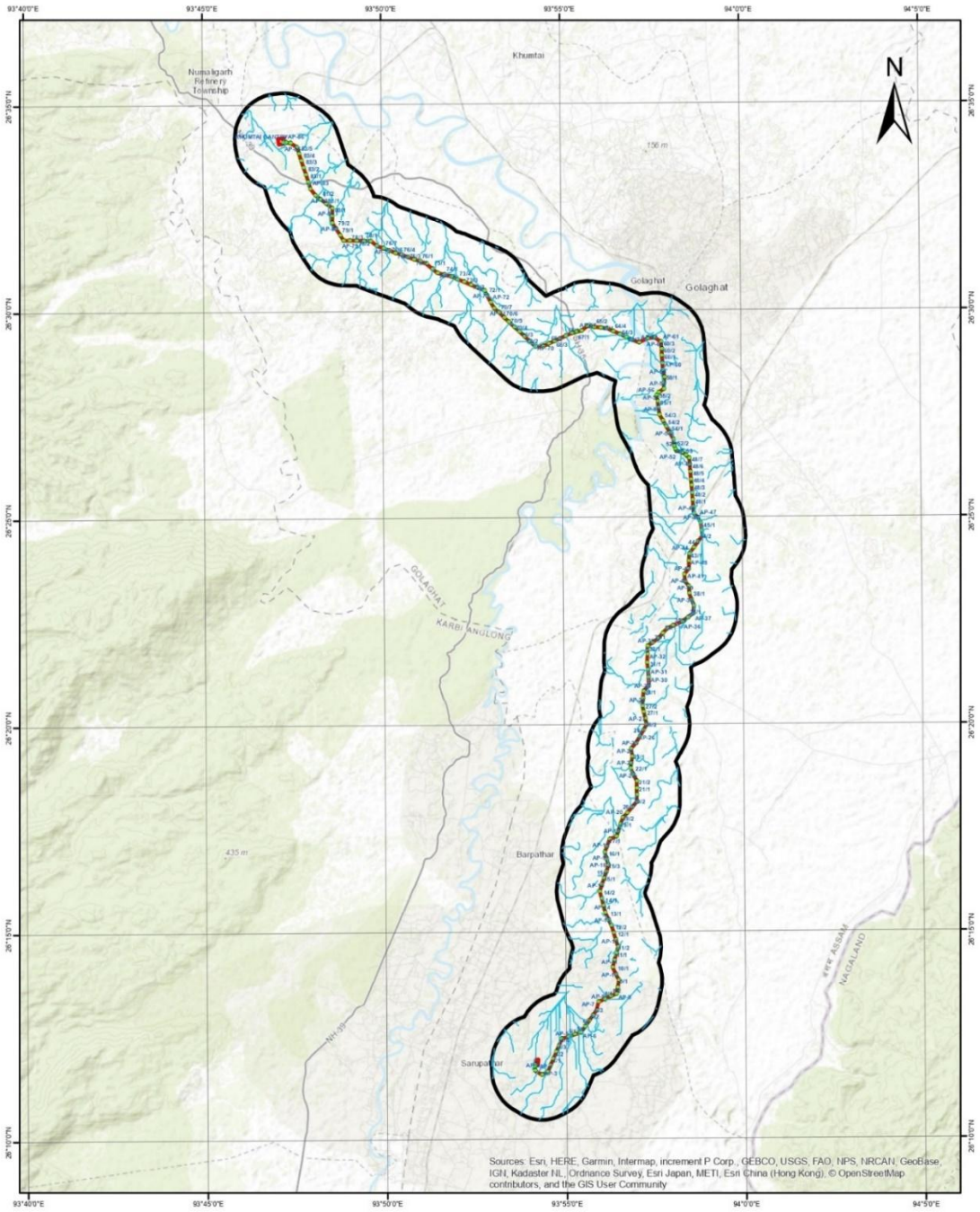


Figure 4.4 A: Drainage map of the study area of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line



Legend				Drainage Map for Baseline
	Tower Location		Drain	LILO of 132kV Jorhat (W) – Bokakhat (Existing) at Khumtai (New) S/C Line
	Baseline (2 km)		River/Water Bodies	0 0.325 0.65 1.3 1.95 2.6 Kilometers
		Transmission Line Alignment		*Data Source:* Esri, HER, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), ©OpenStreetMap contributors, and the GIS User Community

Figure 4.4 B - LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line



Legend				Drainage Map for Baseline
	Tower Location		Drain	132 kV Khumtai (New) - Sarupathar (Existing) S/C Line
	Baseline (2 km)		River/Water Bodies	0 1.252.5 5 7.5 10 Kilometers
		Transmission Line Alignment		***Data Source:*** **Esri, HER, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), ©OpenStreetMap contributors, and the GIS User Community**

Figure 4.4 C - Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

4.3.4 Geology & Soil Characteristics

Geologically the district is underlain by Quaternary formation followed by Archaean group of rocks. Quaternary formation comprises younger and older alluvial deposits consisting of different grades of

sand, pebbles, cobbles, gravel and clay in the area. Major parts in the north of NH-37 passing in the east-west direction in the district show younger alluvial deposits. The older alluvial deposits occur mainly towards southern parts of the NH-37. The hard crystalline of Archaean age covers extreme southern boundary of the district merging with Karbi-Anglong district. The rock types are granite, granite gneiss and quartzite.

4.3.5 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

Temperature Golaghat district as per the CGWB booklet of Golaghat, the climate of the district is subtropical and humid characterized by moderate rainfall. The maximum temperature goes up to 36°C during June - July and minimum temperature falls to 6°C in December - January.

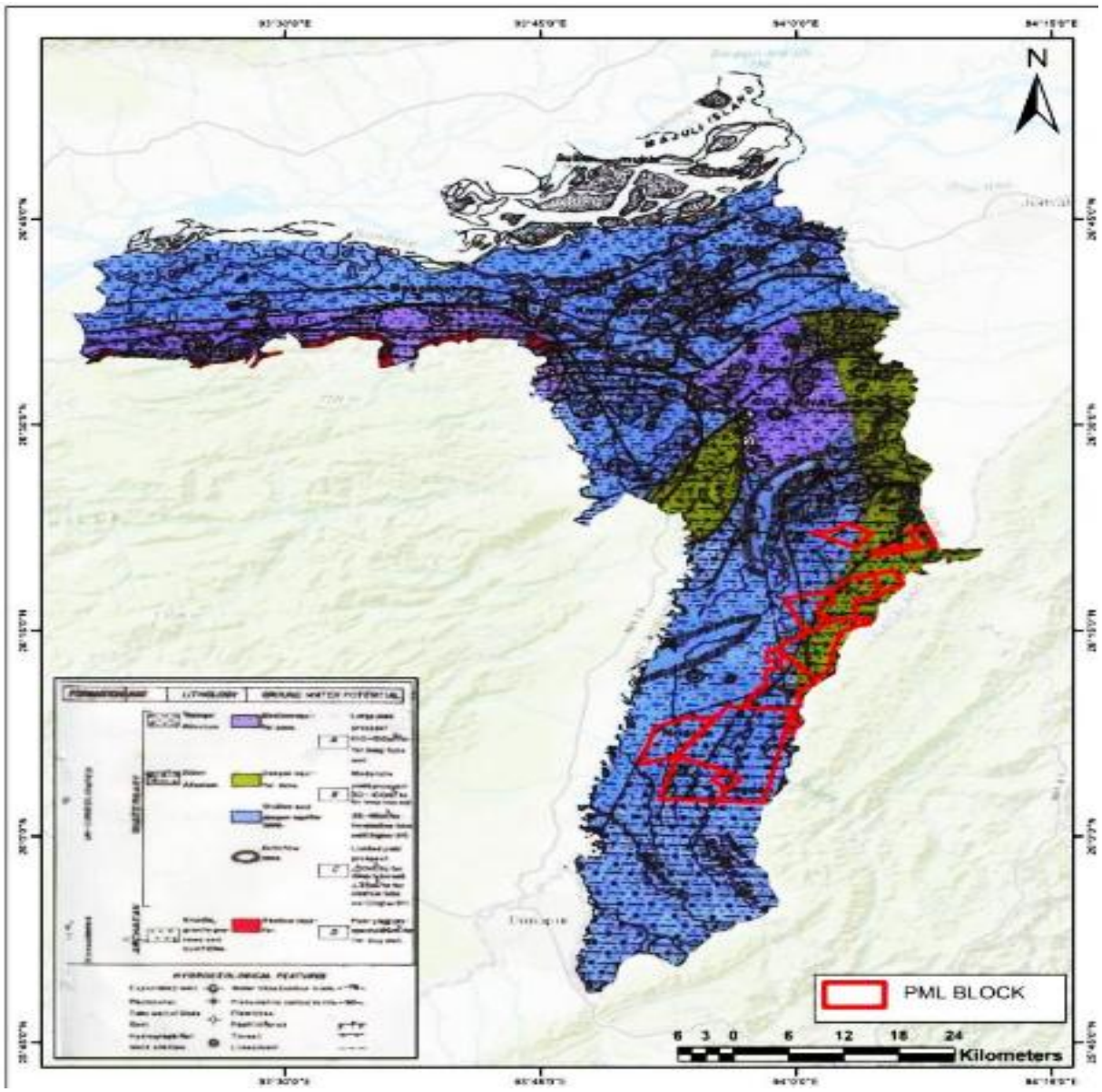
Relative Humidity Golaghat district as per the report of CGWB of Golaghat district, 93 to 95% during morning hours and during afternoon hours it varies from 53 to 75% which is a normal pattern of this region.

Rainfall Golaghat district Golaghat district gets a south-west monsoon rainfall of around 2012 mm from the month of April and continues up to September - October. The pattern of rainfall varies in the district, from south to north, the intensity of rainfall increases, and the maximum rainfall is recorded in the north eastern parts of the district. As per the Climatological Normals (1971-2000), the mean annual rainfall was recorded as 3324.9 mm.

4.3.6 Ground Water Characteristics

As per the report of CGWB (2013), sub-surface geology as evidenced from available data infers that the potential aquifer pertaining to Quaternary formation exist down to the explored depth of 300 m. The cumulative thickness of aquifer zones has the tendency to increase towards the north and in the south-eastern parts, the thickness reverses considerably. The hydrogeology of the district is characterized by ground water occurring under water table to confined conditions. Depth to water level in major parts of the district varies from 2 to 5 m. In the extreme southern and southwestern parts close to hills, the water level is found to be deeper and generally rests within 5 to 7 m. The movement of ground water is from south to north. The water level trend shows that there is gradual rising of water level in the district. The study of water level fluctuation by CGWB during pre and post monsoon revealed that during pre-monsoon period about water level marked up to 3.8 to 7.96 m bgl. During post-monsoon period water level marked above 3.31 – 6.89 m bgl.

Hydrogeological map of Golaghat district is given in **Figure 4.5.**



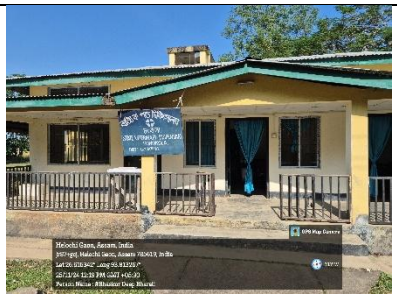
Source: Central Ground Water Board

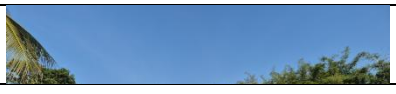
Figure 4.5: Hydrogeological map of Golaghat district

4.3.7 Sensitive Receptors

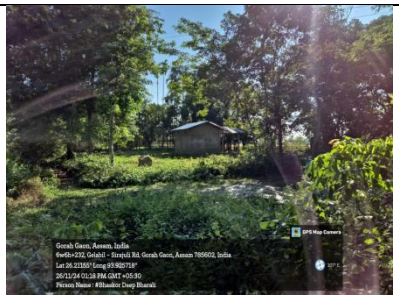
There are (i) 3 Schools and Colleges, 1 Hospitals, 1 Places of worship and 1 Cultural Centre in LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S. /C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line; (ii) 2 Schools and Colleges, 1 Hospitals and 1 Places of worship LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line; (iii) 20 Schools and Colleges, 3 Hospitals, 10 Places of worship, 2 Office, 1 Market places and 1 Bus Stop in Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line. Details of sensitive receoprs within 500 m from the centerline of the TL against the tower are given in table below.

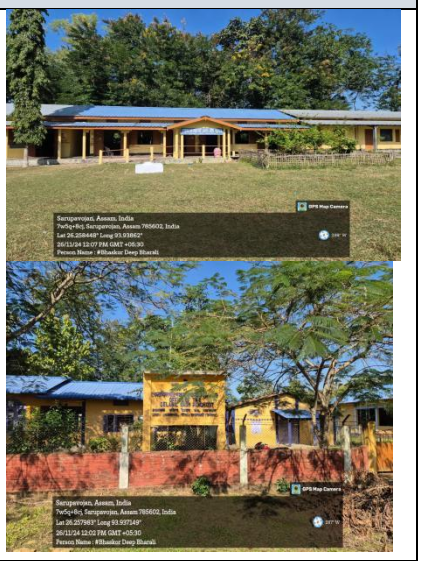
Table 4.1: Details of sensitive receoprs within 500 m from the centeline of the three TL

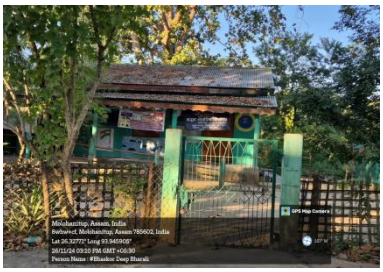
Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
A - LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line					
1.	AP-1	93°49'19.1"E 26°37'38.9"N	Borahi Gaon Kurmi Namghar (93°49'23.25"E 26°37'51.08"N) - Right Hand Side (RHS) from CL	391	
2.	AP-2	93°49'18"E 26°37'37.8"N	Borahi Chonkola Gaon Namghar (93°49'4.43"E 26°37'43.59"N) – RHS from CL	412	
3.	3/1	93°49'14.6"E 26°37'23.5"N	Borahi Chonkola ME School (93°49'20.99"E 26°37'20.21"N) - Left Hand Side (LHS) from CL	204	
4.	AP-4	93°49'7.9"E 26°37'15.6"N			
5.	AP-5	93°49'5.5"E 26°36'57.5"N	Assam State Veterinary Hospital (93°48'48.61"E 26°36'59.03"N) – RHS from CL	460	
6.	AP-6	93°49'13.5"E 26°36'43.4"N	Khumtai Na-Gaon Namghar (93°49'31.62"E 26°36'47.47"N) – LHS from CL Khumtai Somobai Samity Office	415 380	

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
			(93°49'29.04"E 26°36'48.25"N) – LHS from CL		
7.	6/1	93°49'23.3"E 26°36'36.2"N	Khumtai Ahom Kalakhetra (93°49'39.39"E 26°36'43.54"N) – LHS from CL	460	
8.	AP-7	93°49'32"E 26°36'29.8"N			
9.	AP-8	93°49'40.9"E 26°36'13.4"N	Khumtai Leteku Chapori L.P. School (93°49'36.40"E 26°36'10.48"N) – RHS from CL	120	
10	18/2	93°48'16.4"E 26°34'20.4"N	Baptist Church (93°48'4.16"E 26°34'33.37"N) – RHS from CL	458	
11	18/3	93°48'4"E 26°34'18.1"N			
B - LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line					
1.	AP-1	93°48'24.3"E 26°38'0.8"N	Borua Kachupathar High School (93°48'13.27"E 26°37'49.87"N) – RHS from CL	452	
2.	AP-3	93°48'37"E 26°37'53.5"N	Barahi Dahsuk Namghar	170	

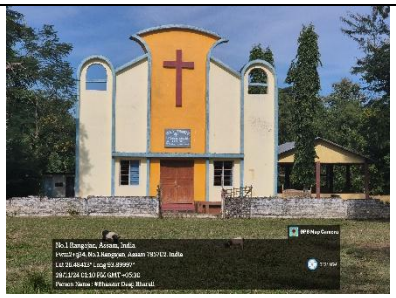
Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
3.	3/1	93°48'40.9"E 26°37'43.2"N	(93°48'45.01"E 26°37'49.64"N) – LHS from CL		
4.	4/1	93°48'48.8"E 26°37'4.1"N	Assam State Veterinary Hospital (93°48'48.61"E 26°36'59.03"N) – LHS from CL	44	
5.	5/2	93°48'42.3"E 26°36'30.5"N	Nepalikhuti Shiv Mandir (93°48'33.81"E 26°36'24.08"N) – RHS from CL	210	
6.	AP-10	93°48'52.5"E 26°35'33"N	Gandhi Gaon Lower Primary School (93°48'57.78"E 26°35'31.09"N) - LHS from CL	145	
C - Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line					
	4/1	93°54’33.20” E 26°11’46.90” N	Ekorani Mura Gaon Lower Primary School (93°54'42.83"E 26°11'42.65"N) - RHS from CL	300	

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
	AP-5	93°54'52.30"E 26°12'25.10"N	Upperlangtha Post Office (93°55'1.33"E 26°12'18.18"N) - RHS from CL	275	
	5/1	93°55'3.60"E 26°12'28.40"N	Punadhar Weekly Market (93°55'5.74"E 26°12'20.94"N) – RHS from CL	236	
	6/1	93°55'31.10"E 26°12'42.60"N	Matikhala Majhi Than (93°55'30.62"E 26°12'40.97"N) – RHS from CL	17	
	6/2	93°55'37.90"E 26°12'50.80"N	Premhora M.E. School (93°55'51.70"E 26°12'47.23"N) – RHS from CL	368	
	6/3	93°55'44.60"E 26°12'58.90"N			
	AP-10	93°56'28.60"E 26°13'49.20"N	Gorbosti Primary Health Sub Center (93°56'8.37"E 26°13'51.02"N) – LHS from CL	468	

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
	AP-14	93°56'6.50"E 26°15'27.20"N	Naharbari MV School (93°56'18.98"E 26°15'30.00"N) – RHS from CL Gelabil Gaon Panchayat (93°56'14.03"E 26°15'29.19"N) - RHS from CL	325 213	
	14/1	93°56'3.50"E 26°15'37.70"N	Durga Maa Temple (93°56'16.91"E 26°15'43.16"N) – RHS from CL	400	
	AP-15	93°55'57.40"E 26°15'58.60"N	Jaljori Baromukhiya Namghar (93°55'44.27"E 26°16'7.56"N) – LHS from CL	435	
	15/1	93°56'1.40"E 26°16'8.60"N			
	16/1	93°56'9.60"E 26°16'44.80"N	Baramukhia High School (93°55'51.44"E 26°16'45.87"N) – LHS from CL	480	
	AP-17	93°56'6.50"E 26°16'55.10"N			

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
	AP-25	93°56'51.20"E 26°19'25.10"N	Binapani Hindi School (93°57'4.42"E 26°19'23.47"N) – RHS from CL	295	
	AP-26	93°57'0.20"E 26°19'33.40"N	Basapathar Bonuagaon LP School (93°56'50.57"E 26°19'37.49"N) – LHS from CL	275	
	38/1	93°58'34.50"E 26°23'0.50"N	Believers Eastern Church Chipahibari (93°58'20.22"E 26°23'12.96"N) – LHS from CL	280	
	AP-39	93°58'30.50"E 26°23'9.50"N			
	AP-40	93°58'30.40"E 26°23'19.50"N	Nahorjan Bokultol Namghar (93°58'33.49"E 26°23'16.29"N) – RHS from CL	80	
	45/1	93°58'52.40"E 26°24'40.50"N	Doyang T. E. Hospital (93°58'53.32"E 26°24'49.10"N) – RHS from CL	60	
	AP-46	93°58'50.90"E 26°24'51.30"N			

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
	AP-48	93°58'39.10"E 26°25'4.90"N	Doyang Chah Janajati LP School (93°58'30.33"E 26°24'50.77"N) – LHS from CL	480	
	AP-53	93°58'7.20"E 26°26'43.50"N	Garigaon High School (93°58'12.48"E 26°26'56.41"N) – RHS from CL		
	AP-54	93°58'6.00"E 26°26'53.00"N		200	
	55/1	93°57'41.20"E 26°27'39.20"N	Nil	298	
	55/2	93°57'39.80"E 26°27'47.90"N	Borpatharua Hori Naamghar (93°57'51.01"E 26°27'45.27"N) – RHS from CL		
	AP-56	93°57'38.30"E 26°27'56.70"N			
	AP-57	93°57'42.60"E 26°28'1.30"N	Da chamua namghar (93°57'37.32"E 26°28'1.57"N) – LHS from CL	116	
	AP-58	93°57'50.70"E 26°28'6.00"N	Sankardev Prathomik Vidyalaya (93°57'47.66"E 26°28'1.42"N) – RHS from CL	69	

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
	AP-69	93°54'28.90"E 26°29'8.80"N	John Bosco Catholic Church, Shantipur (93°54'25.43"E 26°29'11.55"N) – RHS from CL	83	
	AP-70	93°54'15.60"E 26°29'8.80"N			
	70/1	93°54'6.60"E 26°29'16.20"N	Holly Trinity Catolic Church (Balijan No 1) (93°54'1.04"E 26°29'4.33"N) – LHS from CL	370	
	AP-71	93°53'7.40"E 26°30'4.40"N	Gowala Basti Shiv Mandir (93°53'0.33"E 26°30'1.50"N) - LHS from CL	210	
	AP-72	93°53'1.50"E 26°30'12.90"N	Goronga Balijan School (93°53'11.43"E 26°30'21.99"N) – RHS from CL	370	
	72/1	93°52'55.70"E 26°30'22.50"N			
	AP-77	93°49'51.20"E 26°31'35.60"N	1 No Sesabil LP School (93°49'47.45"E 26°31'39.50"N) – RHS from CL	24	
	AP-78	93°49'41.40"E 26°31'42.90"N			

4.3.8. Ambient Air Quality

Based on the observation at site and volume of civil construction at site it has been perceived that the ambient air quality of the project footprint and study area is good. The ambient air quality monitoring conducted in **Khumtai S/s** is given below.

Pollutant	Time Weighted Average	Concentration in Ambient air (μg/m³), NAAQS, MoEF&CC 2009		WHO AQGs 2021	Results (Baseline data)	Results (Data generated for post-monsoon season 2024)
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas			
Particulate Matter: PM10 (<10 μm)	Annual 24 hr	60 100	60 100	15 45	59	54
Particulate Matter: PM2.5 (<2.5 μm)	Annual 24 hr	40 60	40 60	5 15	32	33

The data for T/L will be taken by EPC contractor for sensitive receptor location for Ambient Air Quality within 100 m from Center Line only during CESMP report preparation which will be considered as baseline data and provided in updated ESIA-ESMP report.

4.3.9 Ambient Noise Level

Based on the observation at site it has been perceived that the project footprint and study area has very minimal noise level. The ambient noise level monitoring conducted in **Khumtai S/s s** is given below.

Area Code	Category	Limits in Decibels (dB A)*		WBG Noise Standards**	
		Day Time	Night Time	Day Time	Night Time
A	Industrial	75	70	70	70
B	**Commercial**	**65**	**55**	**70**	**70**
C	Residential	55	45	55	45
D	Silence Zones	50	40	55	45
Khumtai S/s		42.5	35.1	61.8	44.8

The data for T/L will be taken by EPC contractor for sensitive receptor location for Noise level on Noise level within 100 m from Center Line only during CESMP report preparation which will be considered as baseline data and provided in updated ESIA-ESMP report.

4.3.10 Surface and Ground Water Quality

Based on the observation at site and volume of civil construction it has been perceived that the project footprint and study area has very minimal surface and ground water contamination anticipated from the project works. The Water Quality monitoring conducted in Khumtai S/s s is given below.

Parameters	**Results (Baseline data)**	**IS-10500-2012 Requirement Acceptable Limit)**	**IS-10500-2012 Permissible Limit in the absence of alternate source**	**Results (Data generated for post-monsoon season 2024)**	**Requirement Acceptable Limit**	**Permissible Limit in the absence of alternate source**	**Remarks**
pH	6.51	6.5-8.5	No relaxation	6.58	6.5-8.5	No relaxation	
Conductivity	0.13	_	_	0.123	_	_	
Colour	2	5	15	1	5	15	
Total Dissolved Solids	46	500	2000	75	500	2000	
Total Suspended Solids	<10	_	_	<10	_	_	
Turbidity	2	1	5	0.85	1	5	
BOD	---	---	---	<2	_	_	
Dissolved Oxygen	---	---	---	3.4	_	_	
Chlorides	6.9	250	1000	10.9	250	1000	
Fluoride	<0.5	1	1.5	<0.5	1	1.5	
Iron	<0.06	0.3	No relaxation	0.22	0.3	No relaxation	
Oil and Grease	<2	_	_	<2	_	_	
Sulphates	12	200	400	3.5	200	400	
Hardness	48	200	600	25.6	200	600	
Nitrate	<5	45	No relaxation	<2	45	No relaxation	
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	
E.Coli	---	---	---	Absent	Absent	Absent	
Total Coliform	---	---	---	Absent	Absent	Absent	
Pesticides	---	---	---	BDL	_	_	
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	
Floating Materials	---	---	---	Not Vissible	_	_	

4.3.11 Soil Quality

Based on the observation at site and volume of civil construction at site it has been perceived that the project footprint and study area has very minimal soil contamination anticipated from the project works. The Soil Quality monitoring conducted in Khumtai S/s s is given below.

Parameters	**Results (Baseline data)**	**Results (Data generated for post- monsoon season 2024)**	**Remarks**
pH value (1.5)	5.54	6.18	
Sulphite in SO_3 in %	5.8	6.8	
Chloride in mg/kg	6.8	13.6	

Parameters	Results (Baseline data)	Results (Data generated for post- monsoon season 2024)	Remarks
ORP in mV	568	425	
Water soluble salts as EC in mS/m	132	253	
Organic matter in %	4.5	2.3	
Moisture Content in %	34.5	8.64	

4.4 Biological Environment

4.4.1 Floral Assessment

The habitats in the study area include agricultural land, homestead plantation, open scrub, water bodies and open forest areas. The vegetation associated with these habitats are 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 found in the study area.

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

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.

Open scrub

The open scrub vegetation in the study area includes tree species of Dipterocarpus macrocarpus, Butea monosperma, Azadiracta indica, Albizia lebbeck, Cassia fistula, Tectona grandis, Phoenix sylvestris along with shrubs such as *Calotropis procera, Ziziphus nummularia, Ziziphus mauritiana, Lantana camara, Hyptissuaveolens* etc. Herbs and grass species recorded were *Argemone mexicana, Cassia tora, Chromolaena odorata, Celosia argentea* etc.

Open Forest

Open forest areas primarily include tree species Dipterocarpus macrocarpus planted by the forest department. Other tree species include *Gmelina arborea, Dalbergia sissoo, Mesua ferrea and Bombax ceiba* etc. Shrub species include *Ziziphus nummularia, Lantana camara, Hyptissuaveolens* etc.

Water Bodies

The River Brahmaputra flowing in east-west direction in the extreme northern parts of the district and its tributaries flowing in northerly direction, control the entire drainage system of the district and plays an important role in the ground water occurrence and control of the district. Important Rivers of the district are Dhansiri and Dayang. These rivers have meandering courses with abandoned channels in the form of bils and ox-bow lakes along their courses. Aquatic macrophytes associated with these water bodies are *Eichhornia crassipes* (Mart.) S.L, *Salvinia molesta Mitcheel*, *Colocasia esculenta* (L.) Vent etc.

Trees within the transmission line corridor

The transmission line wise number of trees including fruit & non fruit bearing, shade trees of tea garden and bamboo etc. are as under:

- 220kv Samaguri to Mariani- 357 nos. trees
- 132kv Jorhat West to Bokakhat - 479 nos. trees
- 132 kV Sarupathar to Khumtai - 3256 nos. trees

4.4.2 Faunal Assessment

As per the table below 23 species of mammals, 9 species of reptiles, 3 species of amphibians and 4 species of Avifauna were reported from the study area during site visit. Out of these, 5 Endangered, 5 Vulnerable and one Near Threatened mammal; one Critically Endangered and two Near Threatened Reptile and one Critically Endangered Avifauna has been recorded from the study area. Detailed list of fauna is given as under.

Table 4.2: List of faunal species found in study area

Sl. No.	Common Name	Scientific Name	IUCN Conservation Status
Mammals			
1	Rhesus Macaque	*Macaca muletta*	Least Concern
2	Indian Flying Fox	*Pteropus medius*	Least Concern
3	Chinese Bamboo Rat	*Rhizomys sinensis*	Least Concern
4	Indian Hare	*Lepus nigricollis*	Least Concern
5	Wild boar	*Sus scrofa*	Least Concern
6	Small Indian Mongoose	*Herpestes auropunctatus*	Least Concern
7	Irrawaddy Squirrel	*Callosciurus pygerythrus*	Least Concern
8	Black rat	*Rattus rattus*	Least concern
9	House mouse	*Mus musculus*	Least Concern
10	Elephant	*Elephas maximus*	Endangered
11	Western Hoolock Gibbon	*Hylobates hoolock*	Endangered
12	Stumped Tailed Macaque	*Macaca arctoides*	Vulnerable
13	Southern Pig Tailed Macaque	*Macaca nemestrina*	Endangered
14	Slow Loris	*Nycticebus coucang*	Endangered
15	Assamese Macaque	*Macaca assamensis*	Near Threatened
17	Tiger	*Panthera tigris*	Endangered
18	Leopard	*Panthera pardus*	Vulnerable
19	Fishing Cat	*Prionailurus viverrinus*	Vulnerable
20	Barking Deer	*Muntiacus muntjak*	Least Concern
21	Sambar	*Rusa unicolor*	Vulnerable
23	Gaur	*Bos gaurus*	Vulnerable
Reptiles			
1	Indian Cobra	*Naja naja*	Least Concern
2	Rat snake	*Ptyas mucosus*	No records
3	Common Krait	*Bungarus caeruleus*	Least Concern
4	Western Russel's viper	*Daboia russelii*	Least Concern
5	Changeable Lizard	*Calotes versicolor*	Least Concern
6	Asian Chameleon	*Chamaeleo zeylanicus*	Least Concern
7	Asian Giant Tortoise	*Manouira emys*	Critically Endangered
8	Monitor Lizard	*Varanus bengalensis*	Near Threatened
9	Indian Rock Python	*Python molurus*	Near Threatened

Sl. No.	Common Name	Scientific Name	IUCN Conservation Status
Amphibians			
1	Boie's Wart Frog	*Fejervarya limnocharis*	Least Concern
2	Indian Bull Frog	*Hoplobatrachus tigerinus*	Least Concern
3	Asian common toad	*Duttaphrynus melanostictus*	Least Concern
Avifauna			
1	White Winged Wood Duck	*Asarcornis scutulata*	Critically Endangered
2	Great Hornbill	*Buceros bicornis*	Vulnerable
3	Wreathed Hornbill	*Rhyticeros undulatus*	Vulnerable
4	Adjutant Stork	*Leptoptilos javanicus*	Vulnerable

Source: https://forest.assam.gov.in/portlets/wildlife-sanctuary, Working Plan of Forest Department, Published research papers, Public Consultation

Avifauna (As per AVISTEP)

As per the Table No. 4.3 below following are the IUCN conservation status:

Critically Endangered (6 species): Baer's pochard, Slender-billed Vulture, White rumped Vulture, White-bellied heron, Red-headed vulture and Bengal Florican.
Endangered (5 species): Black-bellied Tern, Steppe Eagle White Winged Duck, Palla's Fish-eagle.
Vulnerable (7 species): Swamp Francolin, Sarus Crane, River Tern, Pale-capped Pigeon, Indian Spotted Eagle, Greater spotted Eagle, Common Pochard.
Near Threatened (21 species): Alexandrine Parakeet, Ashy-headed Green-pigeon, Asian Woollyneck, Black necked Stork, Black-tailed Godwit, Blossom- headed Parakeet, Cinereous Vulture, Falcated Duck, Ferruginous Duck, Great Thick-Knee, Greater Adjutant, Grey headed Parakeet, Grey-headed Fish-eagle, Himalayan Griffon, Lesser Adjutant, Lesser Fish-eagle, Oriental Darter, Red-breasted Parakeet, Red-headed Falcon, River Lapwing, and Spot-billed Pelican.

Least Concern - 31.

Table 4.3: List of Avifaunal species found in study area

English Name	Scientific Name	IUCN Conservation Status
A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line		
Alexandrine Parakeet	*Psittacula eupatria*	Near Threatened
Asian Blue Quail	*Synoicus chinensis*	Least Concern
Asian openbill Stork	*Anastomus oscitans*	Least Concern
Baer's pochard	*Aythya baeri*	Critically Endangered
Barred Buttonquail	*Turnix suscitator*	Least Concern
Black Francolin	*Francolinus francolinus*	Least Concern
Black necked Stork	*Ephippiorhynchus asiaticus*	Near Threatened
Black Stork	*Ciconia nigra*	Least Concern
Black-bellied Tern	*Sterna acuticauda*	Endangered
Black-tailed Godwit	*Limosa limosa*	Near Threatened
Blossom- headed Parakeet	*Himalayapsitta roseata*	Near Threatened
Brown fish Owl	*Ketupa zeylonensis*	Least Concern
Cinereous Vulture	*Aegypius monachus*	Near Threatened
Common Buttonquail	*Turnix sylvaticus*	Least Concern
Common Greenshank	*Tringa nebularia*	Least Concern

English Name	Scientific Name	IUCN Conservation Status
Common Redshank	*Tringa totanus*	Least Concern
Common Sandpiper	*Actitis hypoleucos*	Least Concern
Common Snipe	*Gallinago gallinago*	Least Concern
Dusky Eagle Owl	*Bubo coromandus*	Least Concern
Eurasian Spoonbill	*Platalea leucorodia*	Least Concern
Falcated Duck	*Mareca falcata*	Near Threatened
Ferruginous Duck	*Aythya nyroca*	Near Threatened
Great Thick-Knee	*Esacus recurvirostris*	Near Threatened
Greater Adjutant Stork	*Leptoptilos dubius*	Near Threatened
Greater painted snipe	*Rostratula benghalensis*	Least Concern
Greater spotted Eagle	*Clanga clanga*	Vulnerable
Grey headed Lapwing	*Vanellus cinereus*	Least Concern
Grey headed Parakeet	*Himalayapsitta finschii*	Near Threatened
Grey-headed Fish-eagle	*Icthyophaga ichthyaetus*	Near Threatened
Himalayan Griffon	*Gyps himalayensis*	Near Threatened
Indian Pond- heron	*Ardeola grayii*	Least Concern
Indian Spotted Eagle	*Clanga hastata*	Vulnerable
Indian Thick Knee	*Burhinus indicus*	Least Concern
Kalij Pheasant	*Lophura leucomelanos*	Least Concern
Lesser Adjutant Stork	*Leptoptilos javanicus*	Near Threatened
Lesser Fish-eagle	*Icthyophaga humilis*	Near Threatened
Little Ringed Plover	*Charadrius dubius*	Least Concern
Long-billed Plover	*Charadrius placidus*	Least Concern
Marsh Sandpiper	*Tringa stagnatilis*	Least Concern
Oriental Darter	*Anhinga melanogaster*	Near Threatened
Pacific Golden Plover	*Pluvialis fulva*	Least Concern
Pale-capped Pigeon	*Columba punicea*	Vulnerable
Palla's Fish-eagle	*Haliaeetus leucoryphus*	Endangered
Pallas's Gull	*Larus ichthyaetus*	Least Concern
Pin-tailed Snipe	*Gallinago stenura*	Least Concern
Rain Quail	*Coturnix coromandelica*	Least Concern
Red Jungle fowl	*Gallus gallus*	Least Concern
Red wattled Lapwing	*Vanellus indicus*	Least Concern
Red-breasted Parakeet	*Psittacula alexandri*	Near Threatened
Red-headed Falcon	*Falco chicquera*	Near Threatened
River Lapwing	*Vanellus duvaucelii*	Near Threatened
River Tern	*Sterna aurantia*	Vulnerable
Sarus Crane	*Grus antigone*	Vulnerable
Slender-billed Vulture	*Gyps tenuirostris*	Critically Endangered
Spot-billed Pelican	*Pelecanus philippensis*	Near Threatened
Spotted Owlet	*Athene brama*	Least Concern
Steppe Eagle	*Aquila nipalensis*	Endangered
Swamp Francolin	*Ortygornis gularis*	Vulnerable
Temminck's stint	*Calidris temminckii*	Least Concern
White rumped Vulture	*Gyps bengalensis*	Critically Endangered
White Stork	*Ciconia ciconia*	Least Concern

English Name	Scientific Name	IUCN Conservation Status
White Winged Duck	*Asarcornis scutulata*	Endangered
White-bellied heron	*Ardea insignis*	Critically Endangered
Wood Sandpiper	*Tringa glareola*	Least Concern
Yellow- Legged Buttonquail	*Turnix tanki*	Least Concern
B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line		
Alexandrine Parakeet	*Psittacula eupatria*	Near Threatened
Asian Blue Quail	*Synoicus chinensis*	Least Concern
Asian openbill Stork	*Anastomus oscitans*	Least Concern
Asian Woollyneck	*Ciconia episcopus*	Near Threatened
Baer's pochard	*Aythya baeri*	Critically Endangered
Barred Buttonquail	*Turnix suscitator*	Least Concern
Black Francolin	*Francolinus francolinus*	Least Concern
Black necked Stork	*Ephippiorhynchus asiaticus*	Near Threatened
Black Stork	*Ciconia nigra*	Least Concern
Black-bellied Tern	*Sterna acuticauda*	Endangered
Black-tailed Godwit	*Limosa limosa*	Near Threatened
Blossom- headed Parakeet	*Himalayapsitta roseata*	Near Threatened
Brown fish Owl	*Ketupa zeylonensis*	Least Concern
Cinereous Vulture	*Aegypius monachus*	Near Threatened
Common Buttonquail	*Turnix sylvaticus*	Least Concern
Common Greenshank	*Tringa nebularia*	Least Concern
Common Redshank	*Tringa totanus*	Least Concern
Common Sandpiper	*Actitis hypoleucos*	Least Concern
Common Snipe	*Gallinago gallinago*	Least Concern
Dusky Eagle Owl	*Bubo coromandus*	Least Concern
Eurasian Spoonbill	*Platalea leucorodia*	Least Concern
Falcated Duck	*Mareca falcata*	Near Threatened
Ferruginous Duck	*Aythya nyroca*	Near Threatened
Great Thick-Knee	*Esacus recurvirostris*	Near Threatened
Greater Adjutant Stork	*Leptoptilos dubius*	Near Threatened
Greater painted snipe	*Rostratula benghalensis*	Least Concern
Greater spotted Eagle	*Clanga clanga*	Vulnerable
Green Sandpiper	*Tringa ochropus*	Least Concern
Grey headed Lapwing	*Vanellus cinereus*	Least Concern
Grey headed Parakeet	*Himalayapsitta finschii*	Near Threatened
Grey-headed Fish-eagle	*Icthyophaga ichthyaetus*	Near Threatened
Himalayan Griffon	*Gyps himalayensis*	Near Threatened
Indian Pond- heron	*Ardeola grayii*	Least Concern
Indian Spotted Eagle	*Clanga hastata*	Vulnerable
Indian Thick Knee	*Burhinus indicus*	Least Concern
Kalij Pheasant	*Lophura leucomelanos*	Least Concern
Lesser Adjutant Stork	*Leptoptilos javanicus*	Near Threatened
Lesser Fish-eagle	*Icthyophaga humilis*	Near Threatened
Little Ringed Plover	*Charadrius dubius*	Least Concern
Long-billed Plover	*Charadrius placidus*	Least Concern
Marsh Sandpiper	*Tringa stagnatilis*	Least Concern

English Name	Scientific Name	IUCN Conservation Status
Oriental Darter	*Anhinga melanogaster*	Near Threatened
Pacific Golden Plover	*Pluvialis fulva*	Least Concern
Pale-capped Pigeon	*Columba punicea*	Vulnerable
Palla's Fish-eagle	*Haliaeetus leucoryphus*	Endangered
Pallas's Gull	*Larus ichthyaetus*	Least Concern
Pin - tail Snipe	*Gallinago stenura*	Least Concern
Rain Quail	*Coturnix coromandelica*	Least Concern
Red Jungle fowl	*Gallus gallus*	Least Concern
Red wattled Lapwing	*Vanellus indicus*	Least Concern
Red-breasted Parakeet	*Psittacula alexandri*	Near Threatened
Red-headed Falcon	*Falco chicquera*	Near Threatened
Red-headed vulture	*Sarcogyps calvus*	Critically Endangered
River Lapwing	*Vanellus duvaucelii*	Near Threatened
River Tern	*Sterna aurantia*	Vulnerable
Sarus Crane	*Grus antigone*	Vulnerable
Slender-billed Vulture	*Gyps tenuirostris*	Critically Endangered
Spot-billed Pelican	*Pelecanus philippensis*	Near Threatened
Spotted Owlet	*Athene brama*	Least Concern
Steppe Eagle	*Aquila nipalensis*	Endangered
Swamp Francolin	*Ortygornis gularis*	Vulnerable
Temminck's stint	*Calidris temminckii*	Least Concern
White rumped Vulture	*Gyps bengalensis*	Critically Endangered
White Stork	*Ciconia ciconia*	Least Concern
White Winged Duck	*Asarcornis scutulata*	Endangered
White-bellied heron	*Ardea insignis*	Critically Endangered
Wood Sandpiper	*Tringa glareola*	Least Concern
Yellow- Legged Buttonquail	*Turnix tanki*	Least Concern
C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line.		
Alexandrine Parakeet	*Psittacula eupatria*	Near Threatened
Ashy-headed Green-pigeon	*Treron phayrei*	Near Threatened
Asian Blue Quail	*Synoicus chinensis*	Least Concern
Asian openbill	*Anastomus oscitans*	Least Concern
Asian Woollyneck	*Ciconia episcopus*	Near Threatened
Baer's pochard	*Aythya baeri*	Critically Endangered
Barred Buttonquail	*Turnix suscitator*	Least Concern
Bengal Florican	*Houbaropsis bengalensis*	Critically Endangered
Black Francolin	*Francolinus francolinus*	Least Concern
Black necked Stork	*Ephippiorhynchus asiaticus*	Near Threatened
Black Stork	*Ciconia nigra*	Least Concern
Black-bellied Tern	*Sterna acuticauda*	Endangered
Black-tailed Godwit	*Limosa limosa*	Near Threatened
Blossom- headed Parakeet	*Himalayapsitta roseata*	Near Threatened
Brown fish Owl	*Ketupa zeylonensis*	Least Concern
Cinereous Vulture	*Aegypius monachus*	Near Threatened
Common Buttonquail	*Turnix sylvaticus*	Least Concern
Common Greenshank	*Tringa nebularia*	Least Concern

English Name	Scientific Name	IUCN Conservation Status
Common Pochard	*Aythya ferina*	Vulnerable
Common Redshank	*Tringa totanus*	Least Concern
Common Sandpiper	*Actitis hypoleucos*	Least Concern
Common Snipe	*Gallinago gallinago*	Least Concern
Dusky Eagle Owl	*Bubo coromandus*	Least Concern
Eurasian Spoonbill	*Platalea leucorodia*	Least Concern
Falcated Duck	*Mareca falcata*	Near Threatened
Ferruginous Duck	*Aythya nyroca*	Near Threatened
Great Thick-Knee	*Esacus recurvirostris*	Near Threatened
Greater Adjutant Stork	*Leptoptilos dubius*	Near Threatened
Greater painted snipe	*Rostratula benghalensis*	Least Concern
Greater spotted Eagle	*Clanga clanga*	Vulnerable
Green Sandpiper	*Tringa ochropus*	Least Concern
Grey headed Lapwing	*Vanellus cinereus*	Least Concern
Grey headed Parakeet	*Himalayapsitta finschii*	Near Threatened
Grey-headed Fish-eagle	*Icthyophaga ichthyaetus*	Near Threatened
Himalayan Griffon	*Gyps himalayensis*	Near Threatened
Indian Pond- heron	*Ardeola grayii*	Least Concern
Indian Spotted Eagle	*Clanga hastata*	Vulnerable
Indian Thick Knee	*Burhinus indicus*	Least Concern
Kalij Pheasant	*Lophura leucomelanos*	Least Concern
Lesser Adjutant Stork	*Leptoptilos javanicus*	Near Threatened
Lesser Fish-eagle	*Icthyophaga humilis*	Near Threatened
Little Cormorant	*Microcarbo niger*	Least Concern
Little Ringed Plover	*Charadrius dubius*	Least Concern
Long-billed Plover	*Charadrius placidus*	Least Concern
Marsh Sandpiper	*Tringa stagnatilis*	Least Concern
Oriental Darter	*Anhinga melanogaster*	Near Threatened
Pacific Golden Plover	*Pluvialis fulva*	Least Concern
Pale-capped Pigeon	*Columba punicea*	Vulnerable
Palla's Fish-eagle	*Haliaeetus leucoryphus*	Endangered
Pallas's Gull	*Larus ichthyaetus*	Least Concern
Pin-tailed Snipe	*Gallinago stenura*	Least Concern
Rain Quail	*Coturnix coromandelica*	Least Concern
Red Jungle fowl	*Gallus gallus*	Least Concern
Red wattled Lapwing	*Vanellus indicus*	Least Concern
Red-breasted Parakeet	*Psittacula alexandri*	Near Threatened
Red-headed Falcon	*Falco chicquera*	Near Threatened
River Lapwing	*Vanellus duvaucelii*	Near Threatened
River Tern	*Sterna aurantia*	Vulnerable
Sarus Crane	*Grus antigone*	Vulnerable
Slender-billed Vulture	*Gyps tenuirostris*	Critically Endangered
Spot-billed Pelican	*Pelecanus philippensis*	Near Threatened
Spotted Owlet	*Athene brama*	Least Concern
Steppe Eagle	*Aquila nipalensis*	Endangered
Swamp Francolin	*Ortygornis gularis*	Vulnerable

English Name	Scientific Name	IUCN Conservation Status
Temminck's stint	*Calidris temminckii*	Least Concern
White- Cheeked Partridge	*Arborophila atrogularis*	Least Concern
White rumped Vulture	*Gyps bengalensis*	Critically Endangered
White Stork	*Ciconia ciconia*	Least Concern
White Winged Duck	*Asarcornis scutulata*	Endangered
White-bellied heron	*Ardea insignis*	Critically Endangered
Wood Sandpiper	*Tringa glareola*	Least Concern
Yellow- Legged Buttonquail	*Turnix tanki*	Least Concern

Source: AVISTEP

AVISTEP India

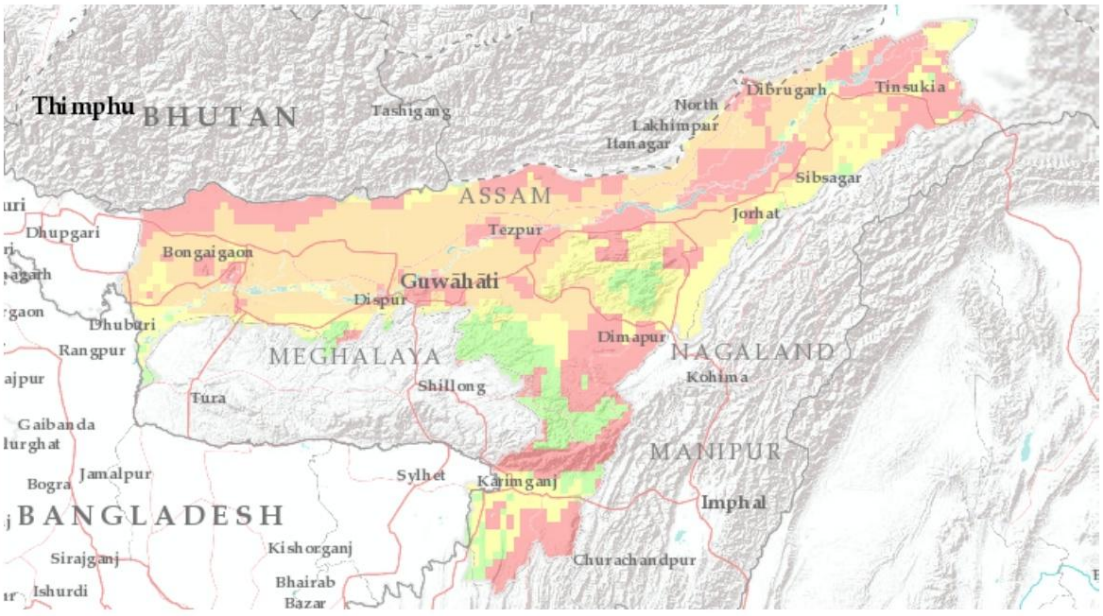
BirdLife INTERNATIONAL

Transmission Powerlines Assessment

Assam, India

Avian Sensitivity

Sensitivity Level	Km² of Country Per Sensitivity Level	% of Country
Low	7,972 km²	10%
Moderate	16,123 km²	21%
High	29,315 km²	37%
Very High	25,025 km²	32%



Source: AVISTEP

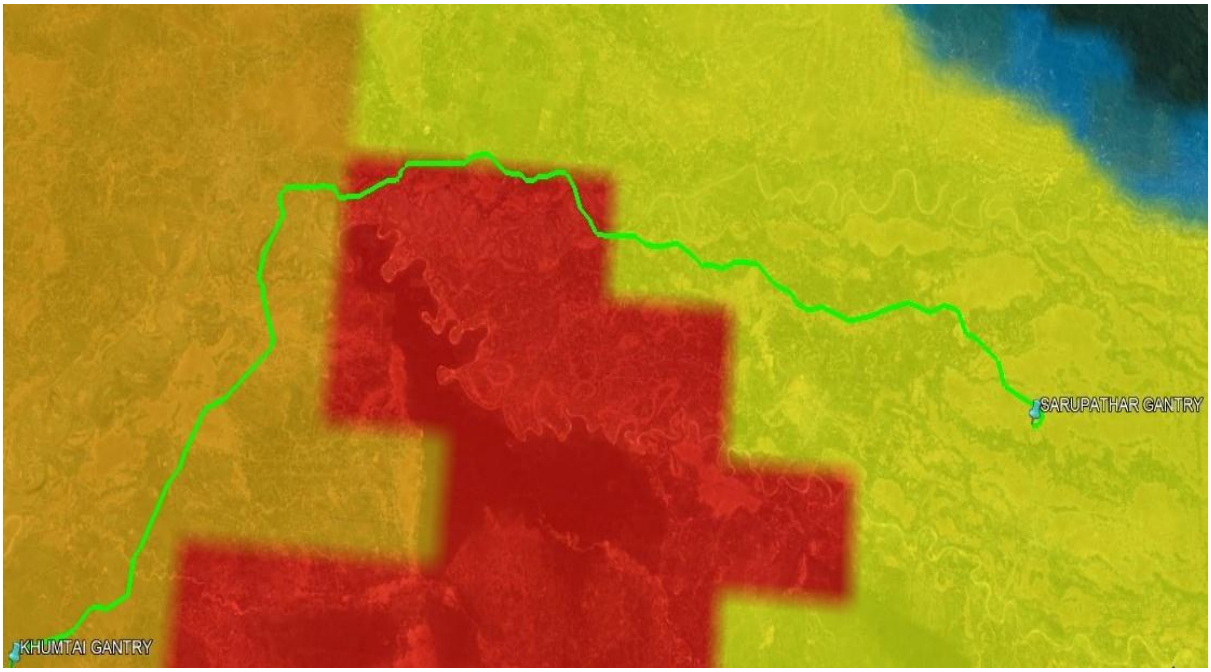
Figure 4.6 A: AVISTEP map of Assam

Source: AVISTEP

Figure 4.6 B: AVISTEP map of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

Source: AVISTEP

Figure 4.6 C: AVISTEP map of LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line



Source: AVISTEP

Figure 4.6 D: AVISTEP map of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

4.4.3 Critical habitats in the Areas

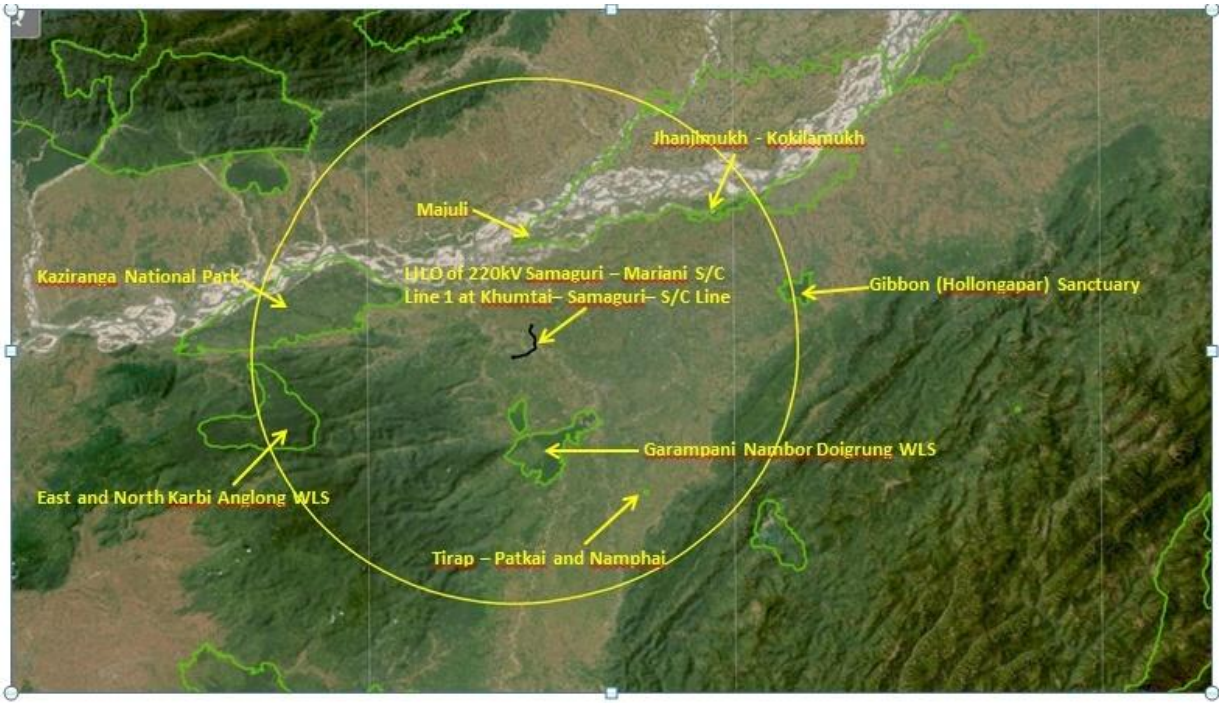
An Analysis for critical habitat Key Biodiversity Areas (KBA) within 5km, 10, and 50 km from the center line of T/L were identified by obtaining data from The World Database of Key Biodiversity Areas and presented in Table and Figure below.

Table 4.4: Critical habitat within 5 km, 10 km, and 50 km from the center line of T/L

Sl. No.	Protected Area / Key Biodiversity Area	Distance from the transmission line		
		LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line– 10.167 km.	LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line– 10.198 km.	Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line– 61.205 km.
1.	Garampani Nambor Doigrung WLS	8.7 Km	8.5 Km	1 Km
2.	East and North Karbi Anglong WLS	39.45 Km	38.82 Km	39.6 Km
3.	Kaziranga National Park	25.23 Km	23.32 Km	25 Km
4.	Gibbon (Hollongapar) Sanctuary	48 km	48.25 Km	39.20 Km
5.	Majuli	16.5 Km	15.41 Km	22.621 Km
6.	Jhanjimukh - Kokilamukh	37 Km	37.99 Km	40.03 Km
7.	Dhansiri reserve	-	-	38.45 Km

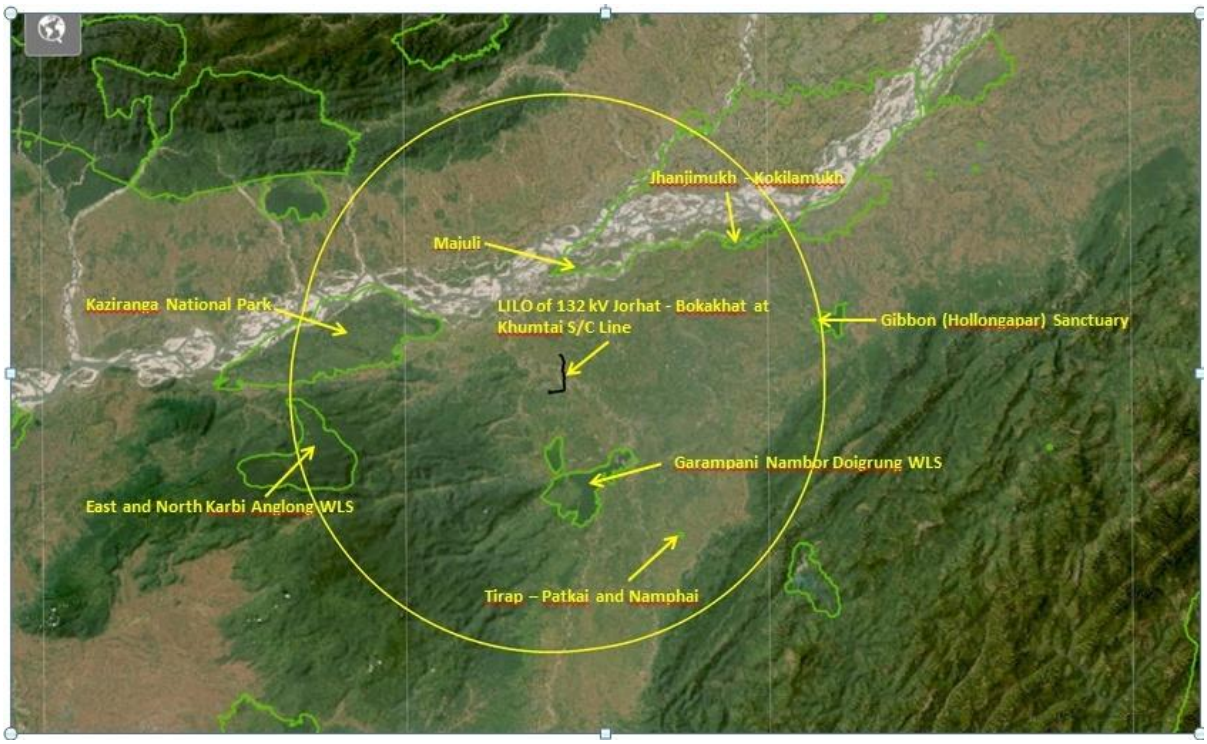
Sl. No.	Protected Area / Key Biodiversity Area	Distance from the transmission line		
		LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line– 10.167 km.	**LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line– 10.198 km.**	**Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line– 61.205 km.**
	Forest			
8.	Doyang Reservoir and Pangti Forest	-	-	29.7 Km
9.	Tirap – Patkai and Namphai	35.46 Km	35.02 Km	7.79 Km

Source: The World Database of Key Biodiversity



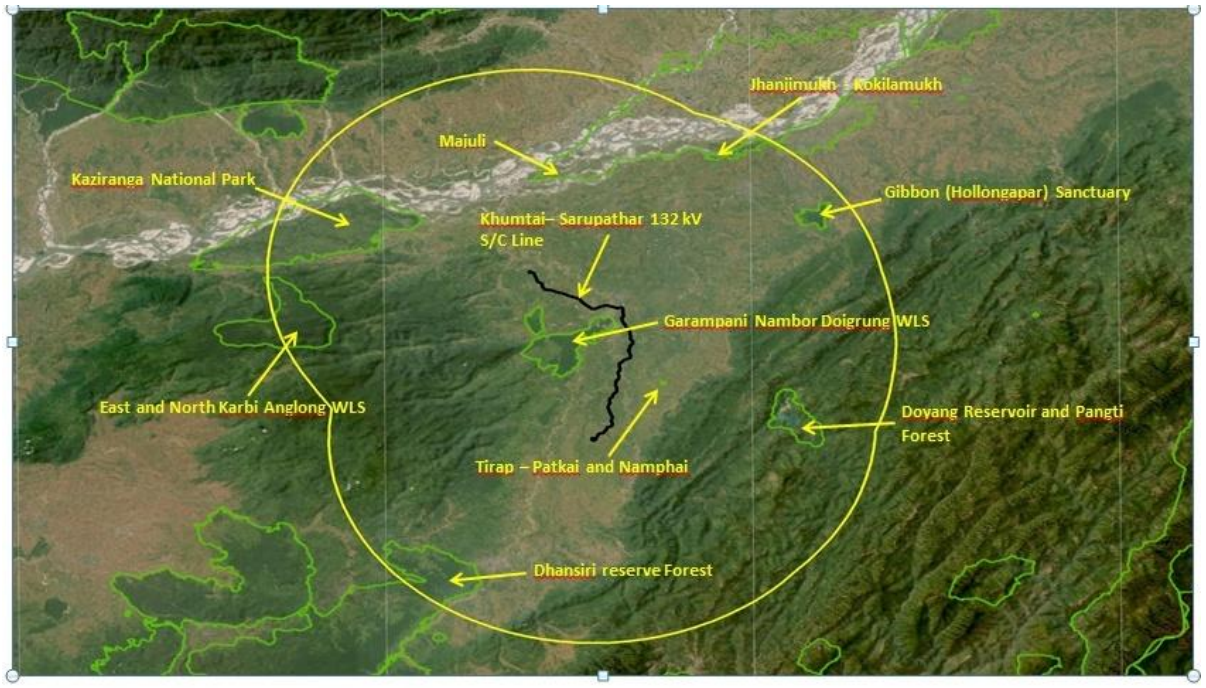
Source: The World Database of Key Biodiversity

Figure 4.7 A: Critical habitat within 5 km, 10 km, and 50 km from the center line of T/L of LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line



Source: The World Database of Key Biodiversity

Figure 4.7 B: Critical habitat within 5 km, 10 km, and 50 km from the center line of T/L of LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line



Source: The World Database of Key Biodiversity

Figure 4.7 C: Critical habitat within 5 km, 10 km, and 50 km from the center line of T/L of Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line

The details of Species triggering KBA criteria within 5km, 10km and 50km from the center line of T/L area as follows:

Table 4.5: Species triggering KBA criteria within 5 km, 10 km, and 50 km from the center line of T/L

Taxonomic group	Scientific name	Common name	Year	IUCN Red List Category
Garampani Nambor Doigrung WLS				
Aves	*Cairina scutulata*	White-winged Duck	2005	EN
Aves	*Leptoptilos javanicus*	Lesser Adjutant	2005	VU
East and North Karbi Anglong WLS				
Aves	Gyps bengalensis	White-rumped Vulture	2004	CR
Aves	Leptoptilos javanicus	Lesser Adjutant	2004	VU
Aves	Columba punicea	Pale-capped Pigeon	2004	VU
Aves	Cairina scutulata	White-winged Duck	2004	EN
Aves	Gyps tenuirostris	Slender-billed Vulture	2004	CR
Aves	Aceros nipalensis	Rufous-necked Hornbill	2004	VU
Mammalia	Hoolock hoolock	Western Hoolock Gibbon	2005	EN
Kaziranga National Park				
Aves	Paradoxornis flavirostris	Black-breasted Parrotbill	2018	VU
Aves	Chatarrhaea longirostris	Slender-billed Babbler	2018	VU
Gibbon (Hollongapar) Sanctuary				
Aves	Leptoptilos javanicus	Lesser Adjutant	2005	VU
Aves	Gyps tenuirostris	Slender-billed Vulture	2005	CR
Aves	Gyps bengalensis	White-rumped Vulture	2005	CR
Aves	Cairina scutulata	White-winged Duck	2005	EN
Majuli				
Aves	Leptoptilos javanicus	Lesser Adjutant	2005	VU
Aves	Pelecanus philippensis	Spot-billed Pelican	2005	VU
Aves	Houbaropsis bengalensis	Bengal Florican	2004	EN
Aves	Clanga clanga	Greater Spotted Eagle	2004	VU
Aves	Gyps bengalensis	White-rumped Vulture	2005	CR
Aves	Gyps tenuirostris	Slender-billed Vulture	2005	CR
Aves	Aythya baeri	Baer's Pochard	2004	VU
Aves	Haliaeetus leucoryphus	Pallas's Fish-eagle	2005	VU
Aves	Francolinus gularis	Swamp Francolin	2005	VU
Aves	Leptoptilos dubius	Greater Adjutant	2005	EN
Aves	Pellorneum palustre	Marsh Babbler	2004	VU
Aves	Chrysomma altirostre	Jerdon's Babbler	2004	VU
Aves	Paradoxornis flavirostris	Black-breasted Parrotbill	2004	VU
Reptilia	Geoclemys hamiltonii	Black Spotted Turtle	2005	VU
Reptilia	Nilssonia hurum	Indian Peacock Softshell Turtle	2005	VU
Reptilia	Nilssonia gangetica	Indian Softshell Turtle	2005	VU
Reptilia	Cuora amboinensis	Southeast Asian Box Turtle	2005	VU
Reptilia	Melanochelys tricarinata	Three-keeled Land Tortoise	2005	VU
Reptilia	Chitra indica	Indian Narrow-headed Softshell Turtle	2005	EN
Jhanjimukh – Kokilamukh				

Taxonomic group	Scientific name	Common name	Year	IUCN Red List Category
Aves	Leptoptilos dubius	Greater Adjutant	2005	EN
Aves	Haliaeetus leucoryphus	Pallas's Fish-eagle	2005	VU
Aves	Pelecanus philippensis	Spot-billed Pelican	2005	VU
Aves	Gyps bengalensis	White-rumped Vulture	2004	CR
Aves	Francolinus gularis	Swamp Francolin	2005	VU
Aves	Leptoptilos javanicus	Lesser Adjutant	2005	VU
Aves	Gyps tenuirostris	Slender-billed Vulture	2004	CR
Aves	Aythya baeri	Baer's Pochard	2004	VU
Aves	Aquila clanga	Greater Spotted Eagle	2005	VU
Dhansiri reserve Forest				
Aves	Aceros nipalensis	Rufous-necked Hornbill	2004	VU
Aves	Leptoptilos dubius	Greater Adjutant	2004	EN
Aves	Cairina scutulata	White-winged Duck	2004	EN
Aves	Gyps bengalensis	White-rumped Vulture	2004	CR
Aves	Pavo muticus	Green Peafowl	2004	VU
Aves	Gyps tenuirostris	Slender-billed Vulture	2004	CR
Aves	Leptoptilos javanicus	Lesser Adjutant	2004	VU
Doyang Reserve and Pangti Forest				
Aves	Falco amurensis	Amur Falcon	2016	LC
Tirap – Patkai and Namphai				
Aves	Leptoptilos javanicus	Lesser Adjutant	2005	VU
Aves	Cairina scutulata	White-winged Duck	2005	EN
Reptilia	Indotestudo elongata	Yellow-headed Tortoise	2005	EN
Reptilia	Manouria emys	Burmese Mountain Tortoise	2005	EN

Critical Habitat-Asian Elephant (Elephas maximus)

Within the broader project influence area, the Asian elephant is considered an ecologically significant species due to its wide-ranging habitat requirements and its role as a keystone species in forest ecosystems. To ascertain the presence of Elephant Movement in the project area, a joint site visit and field verification was conducted by the PMC team along with Forest Department in the Month of March, 2025 and further a public consultation was also conducted in the month of Feb, 2026 to confirm the movement area of Elephant in the project corridor. As far as the presence of other critical endangered / endangered species concerned in the project area, it was confirmed by the forest Department (Field survey report of Range Forest Officer-Golaghat Division) and local communities during field inspection that no other critically endangered (CR) or endangered (EN) species listed on the IUCN Red List were reported within the immediate project footprint or surrounding area.

The other common species reported in the project influence area are:

List of species found in Project Influence Area

Rhesus Macaque	*Macaca muletta*	Least Concern
Indian Flying Fox	*Pteropus medius*	Least Concern
Chinese Bamboo Rat	*Rhizomys sinensis*	Least Concern
Indian Hare	*Lepus nigricollis*	Least Concern
Wild boar	*Sus scrofa*	Least Concern
Indian Mongoose	*Herpestes auropunctatus*	Least Concern
Rat	*Rattus rattus*	Least concern
House mouse	*Mus musculus*	Least Concern
Barking Deer	*Muntiacus muntjak*	Least Concern

Recommendations from the Forest Department, Assam based on the findings of the field investigation:

The project site is predominantly characterized by modified habitats including human settlements, agricultural lands, and fragmented vegetation patches. One of the key concerns associated with transmission infrastructure in elephant landscapes is the potential risk of electrocution due to inadequate ground clearance of transmission lines. A mature Indian elephant, when standing upright with its trunk fully extended, can reach a maximum height of approximately 6 metres. Accordingly, the design of the proposed transmission line has incorporated wildlife-sensitive engineering measures. In flat terrain, the minimum ground clearance of the transmission line has been maintained at greater than 6 metres, ensuring that the conductors remain safely above the maximum reach of an adult elephant. Specifically, a minimum ground clearance of 6.1 metres has been provided throughout the transmission corridor.

Survey Report of Forest Department

GOVT. OF ASSAM
DEPARTMENT OF FOREST AND ENVERONMENT
OFFICE OF THE FOREST RANGE OFFICER :::::::::::::GOLAGHAT RANGE, GOLAGHAT
(rangeofficergolaghat@gmail.com.)

Letter No. G/ AEGCL/2025/ 1707 Dated:- 23/06/2025

To,
The Divisional Forest Officer,
Golaghat Division(T)
Golaghat

Sub: Submission of Survey Report.
Ref.: O.O No.37 Dtd. 21/05/2025 from Divisional Forest Officer, Golaghat

Sir,

With reference to the subject and cited above, I have the honour to submit herewith the survey report which was done by staff of Golaghat Forest Range Office and Officers/staffs of T& T Division, AEGCL, Garmur, Jorhat(Assam). As per my instruction, Smt. Gayatri Das, Fr-I has carried out the survey and submitted report accordingly. The proposed transmission line doesn't passes through the area where there is a possibility to effect either local or migratory birds. However they are going to use the naked wire instead of insulated wire, but sufficient height will be maintained to avoid any Wildlife electrocution incident including Wild Elephant.

This is for of your kind information and necessary action.

Enclo.: Survey report received from
Smt. Gayatri Das, Fr-I and Beat Officer, Barpathar Beat .

Yours faithfully

Range Forest Office,
Golaghat Range,
Golaghat

Date:25/04/2025

To

The Range Forest Officer
Golaghat Range,
Golaghat.

Sub: Regarding Flora and Fauna survey
Ref: Letter No. G/Survey /2025/1039-43 Dtd.22/04/2025.

Sir,

With reference to the subject cited above, I have the honour to submit the report of the survey regarding the proposed transmission line 132 kV D/C Khumtai to Sarupothar (at Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon and Letekujan Grant) on 23/04/2025 along with the AEGCL Team.

During the survey the alignment of the proposed line and its ecological implications were carefully observed and It is noted that the proposed transmission line does not pass through the area where migratory birds arrive. However, the most of the locations where the proposed transmission line planned are Wild- elephant movement area. In some area, we found the foot print of wild elephant . However they are going to use naked Wire instead of insulated /Coated Wire, the sufficient height will be maintained to avoid any incident of Electrocution of Wild elephant. No other possible detrimental effects on flora and fauna due to the proposed transmission line were observed throughout the survey.

Photographs of the survey area along with GPS Coordinates are enclosed herewith.

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

Enclosed: As stated above.

Yours Faithfully,
Gayatri Das, Fr-I.
[Gayatri Das,Fr-I]
O/o Range Forest Officer, Golaghat

Public Consultation on Elephant Movement in Project Corridor: 06.02.2026

Key point discussed:

In location AP 33/0 to AP 34/1 and location AP 51/0 to 55/2

1. A brief discussion was held regarding the project and the proposed Transmission Line (TL) corridor.
2. Discussions were conducted on elephant movement within the project area, including seasonal movement patterns and potential mitigation measures.
3. The presence/spotting of migratory birds in the project area was discussed, along with possible impacts of the proposed transmission line.

Findings: The findings of public consultation are:

1. No elephant movement was reported between locations AP 33/0 to AP 34/1, as confirmed by the local residents.
2. Elephant movement was confirmed by the locals between locations AP 51/0 to AP 55/2. The elephants generally move from Nambor towards the project area, particularly within AP 51/0 to AP 55/2, in search of food.
3. The movement of elephants is generally confined to the stretch between AP 51/0 to AP 55/2 and does not extend across the entire project corridor.
4. No presence or sighting of migratory birds within the project corridor was reported, and confirmed by the local residents.

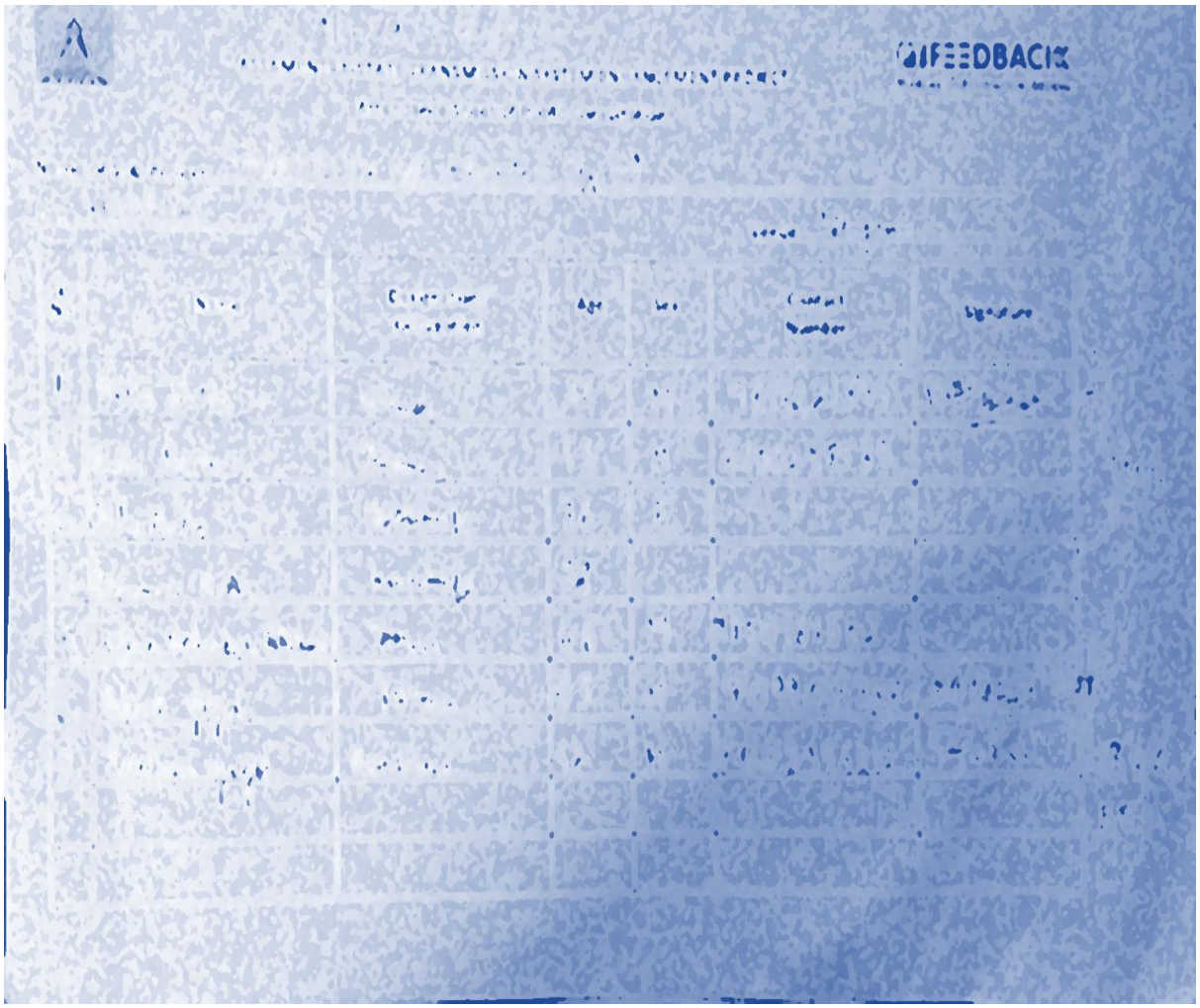
<u>Photographic Evidence of Public Consultation</u>

Location- AP 33/1

Location- AP 34/1

Location-AP 55/1

Attendance Sheet



Note: Insulation of HTL wires are generally not recommended due to:

- **Heat Dissipation:** Overhead lines carry heavy currents and become very hot. Insulation acts as a thermal barrier, trapping heat, which can lead to overheating and potential failure of the line.
- **Weight and Structural Load:** Insulation adds significant weight, requiring more, stronger, and more expensive support towers to prevent excessive sagging or breakage.
- **Air as a Natural Insulator:** At high altitudes, air provides sufficient dielectric strength. Safety is maintained by keeping lines high enough to be out of reach, rather than covering them.
- **Maintenance Issues:** Insulated lines are harder to inspect for damage. Furthermore, insulation degrades over time due to weather, UV radiation, and mechanical stress, leading to potential, more complex failures.
- **Cost and Feasibility:** Insulating kilometers of lines is financially prohibitive. The thickness required for high-voltage insulation (e.g.,1 mm per kilovolt) is impractical.

4.4.4 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.

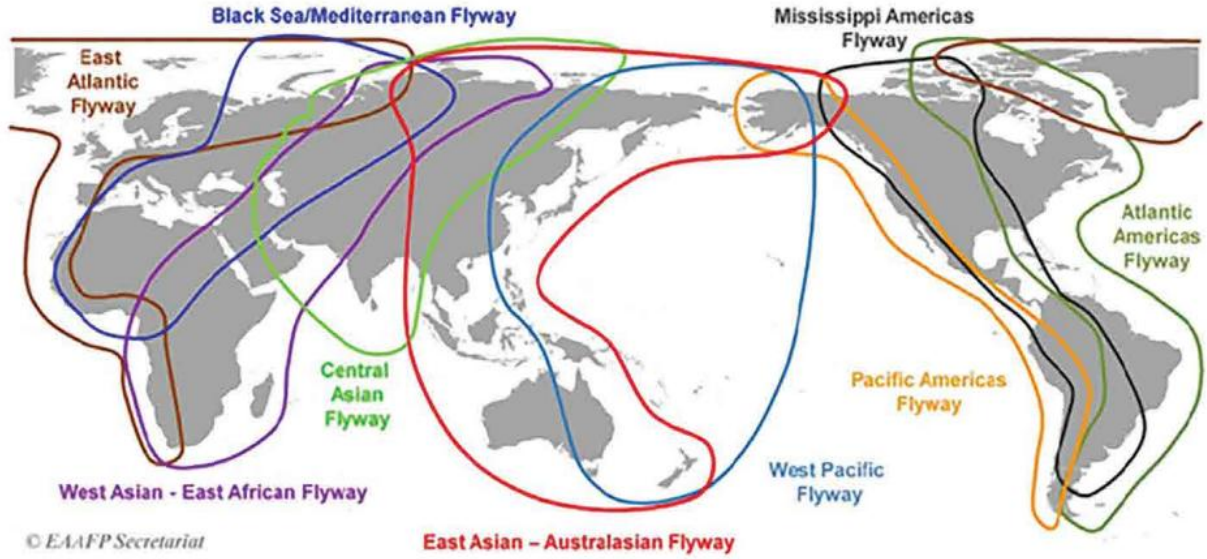


Figure 4.8: The map of the world is showing the migratory birds flyways.
(Image Source: East Asian-Australasian Flyway Partnership (EAAFP); https://www.eaaflyway.net/the-flyway/)

4.5 Social Environment Baseline of the Study Area

4.5.1 State Profile: Assam

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 climate of Assam is typically 'Tropical Monsoon Rainforest Climate', with high levels of humidity and heavy rainfall. People here enjoy a moderate climate all throughout the year, with warm summers and mild winters. Spring (March–April) and autumn (September–October) are usually pleasant with moderate rainfall and temperature.

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 4.6: 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

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%.

4.5.2 District Profile: Golaghat

Golaghat district in Assam is situated on the southern bank of the Brahmaputra River and surrounded by the river Brahmaputra to the north, the state of Nagaland to the south, Jorhat district to the east and Karbi Anglong and Nagaon district to the west. Dhansiri is the principal river, which originates from Laisang peak of Nagaland. It streams through a distance of 352 km from south to north before joining the Brahmaputra. Its catchment area is 1220 km². Doyang, Nambor, Doigrung and Kalioni are the four rivulets of the Dhansiri. The river Kakodonga marks the border between Golaghat and Jorhat districts. The geographical area of Golaghat district is 3502 sq. km with a population of 10,66,888 (2011 census). Golaghat district district is located between 93.97° ELongitude and 26.52° N Latitude.

Table 4.7: Golaghat district Demographic Profile vis-à-vis Assam

Attribute	Golaghat District
Population	1,066,888
Population Density	305
SC population percentage	5.8
ST population percentage	10.5
Sex Ratio (number of females per thousand male)	964
Total literacy rate percentage	77.43
Male literacy rate percentage	83.56
Female literacy rate percentage	71.09
Rural population percentage	90.84

Source: Census of India 2011 data

Golaghat district of Assam has a total population of 1,066,888 as per the Census 2011. Out of which 543,161 are males while 523,727 are females. In 2011 there were a total 227,197 families

residing in Golaghat district. The Average Sex Ratio of Golaghat district is 964.
As per Census 2011 out of total population, 9.2% people live in Urban areas while 90.8% live in the Rural areas. The average literacy rate in urban areas is 91.7% while that in rural areas is 75.9%. Also, the Sex Ratio of Urban areas in Golaghat district is 953 while that of Rural areas is 965.
The population of Children of age 0-6 years in Golaghat district is 134793 which is 13% of the total population. There are 68662 male children and 66131 female children between the age 0-6 years. Thus, as per the Census 2011 the Child Sex Ratio of Golaghat is 963 which is less than Average Sex Ratio (964) of Golaghat district.

The economy of Golaghat district is agriculture-based. Tea, rice and sugar cane are the main agricultural crops grown in the district, with tea being is the largest agricultural industry. There are 63 large tea gardens producing about 20,000 tonnes of tea per year. Moreover, the emergence of small tea growers has proclaimed a new improvement in the district. Small-scale tea growers have gotten considerable fame here because of large incomes compared to other high-land crops. It has caught the desire of unemployed people to take owning tea-gardens as their profession. The rearing and reeling of muga and endi, the making of Japi (headgear) and earthen potential and the extraction ofagaru oil are the cottage industries prevalent in Golaghat district. Quality muga silk and agaru oil in Golaghat district are well known in the state. Long-neck earthen potential made in Dhekial, especially for storing molasses, is unique in the world. 'Japi' of Naharani, Dergaon finds a market in the entire Brahmaputra valley. Numaligarh Refinery Limited (NRL) is the only major heavy industry in the district. Numaligarh Refinery, situated in Numaligarh, is engineered to process 3.0 million tonnes per year of indigenous crude oil, adoptinginnovated technologies. Numaligarh Refinery was custom-built in October, 2000 as the latest multi-faceted refinery in the country, having up-to-the-minute facilities and an intricacy measuring 6.67 on the Nelson complexity index, which is the highest among the public sector refineries. NRL has achieved global standards by obtaining certification of its Quality, Environment and Occupational Health & Safety Management Systems. It has already adopted Hydrocracker technology to enhance the production of middle distillates.

PCRs/CPRs/ Archaeological and Historical Monuments

As per the detailed survey assessment carried out during the confirmation of route alignment, no impact is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs), or archaeological/historical sites, as assessed during the detailed survey. However, there are schools, an Anganwadi Centre (AWC), places of worship, and a veterinary hospital 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 treasure or archaeological artifacts are found during excavation, the same shall be intimated in writing to the Collector/Archaeology Department."
The major archaeological and historical monuments found in Golaghat District are as follows:

- Deoparvat Archaeological Site, located in Numaligarh, which is 6.7 km from the substation area.
- Dubarani Archaeological Site, located in Borpathar, which is 5.4 km away from Sarupathar-Khumtai Line AP No. 18/1.

- Alichiga Tengani Archaeological Site, located in Barpathar, which is 5.4 km from Sarupathar-Khumtai Line AP No. 18.

4.5.3 Study Area Profile

The land for the 220kV LILO of Samaguri - Mariani transmission line tower base is comprised of land from five villages, namely Helochi gaon, Khumtai- Nagaon, Leteku Chapori, Gandhi Gaon and Khumtai.

The land for 132 kV Jorhat West - Bokakhat transmission line tower base is comprised of land from four villages, namely Barahi Gaon, Sarkala Gaon, Barchapari Gaon, Khumtai.

For 132 kV D/C Khumtai - Sarupathar transmission line tower base is comprised of thirty-one villages, namely Ikorani, Premhora, No-1 Tengrajan, No-2 Tengrajan, Rongagarh, Kharua, Nahor Bari, Baramukhia, Borchapori, Chakali, Dapathar, Basapathar, 1 No Herhari, 2 No Herhari, Jamuguri, Kochari, Sipaibari, Dayang, Oating, Garigaon, Borpothorua, Daehomua, Kathkotia, Rangajan, Sarargaon, Telia Gaon, Prajabasti, 1 Long Sesabil, 2 No Doigrang, Pankagaon, Khumtai.

The socio-economic profile/details of the study area would be provided in due course of time in the Abbreviated Resettlement Action Plan.

5. ANALYSIS OF ALTERNATIVES

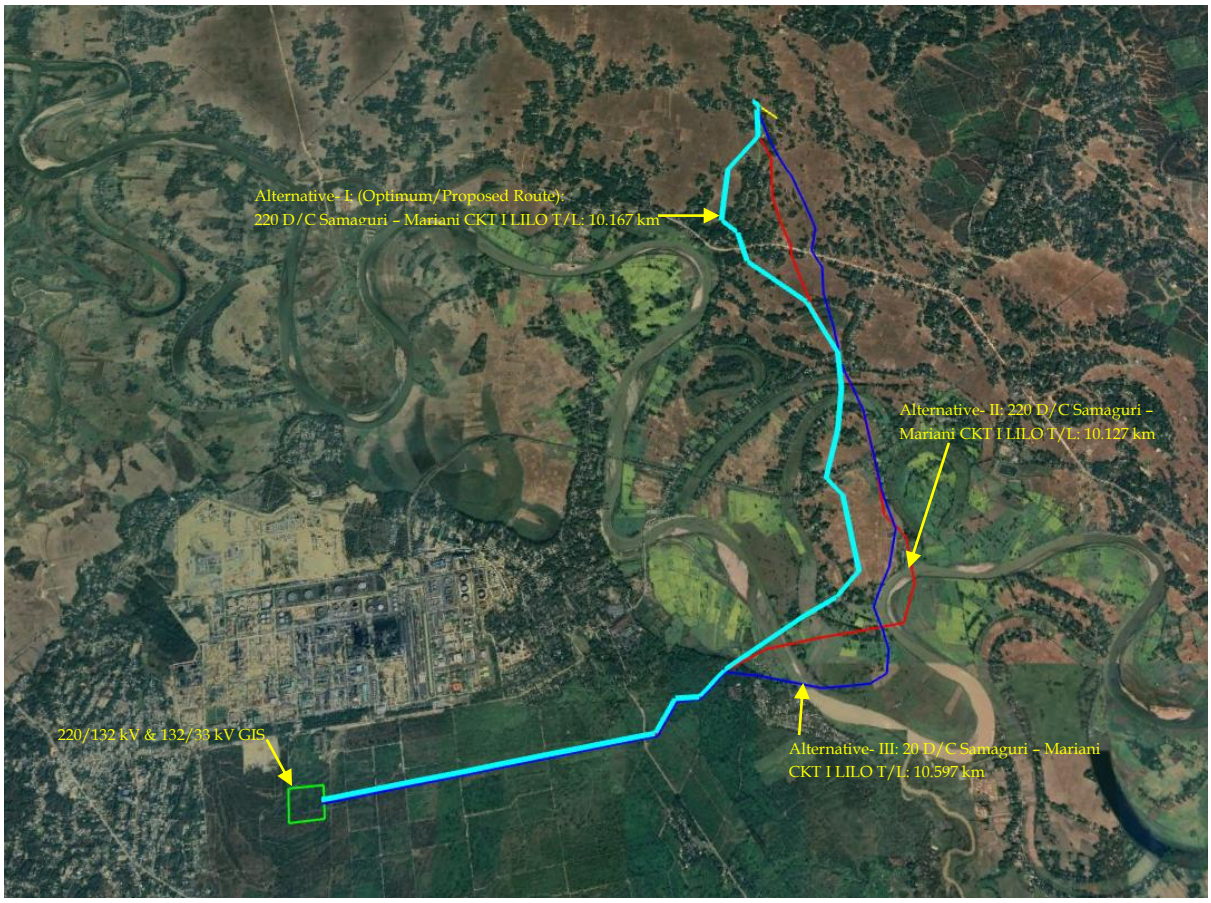
This chapter elucidates detailed analysis about different options of alignment with respect to design, environmental, social and economic aspects during project conception and planning phase.

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

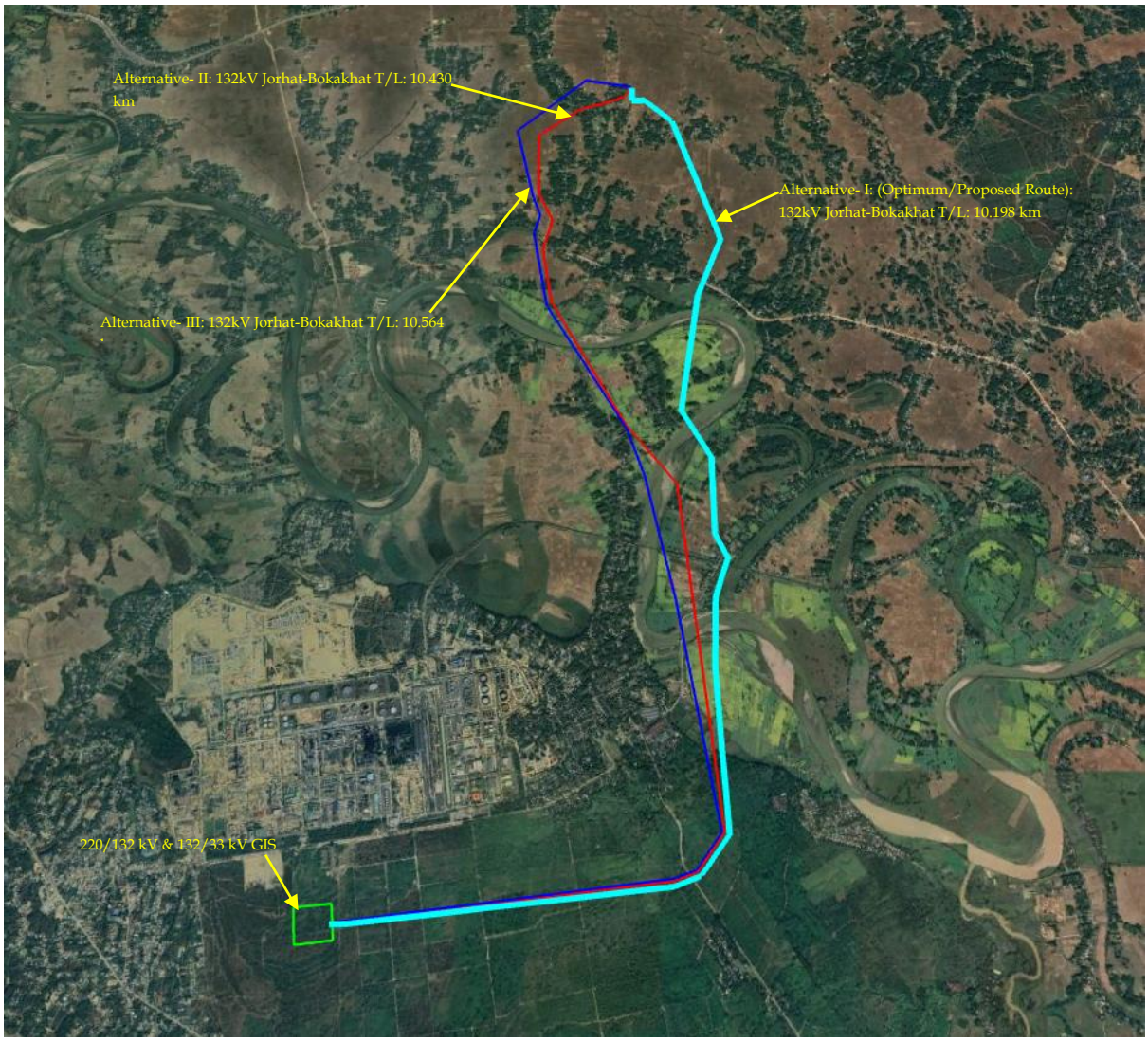
- TL route does not involve any human settlement;
- TL route does not affect on any archaeological / cultural monument;
- Avoid forest area;
- TL route does not pass through any protected area such as National Park / Wildlife Sanctuary;
- TL route avoid disturbance to public utility services such as 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 assessment of alternative routes for features.

220kV LILO of Samaguri - Mariani transmission line



132 kV Jorhat West - Bokakhat transmission line



132 kV D/C Khumtai - Sarupathar transmission line

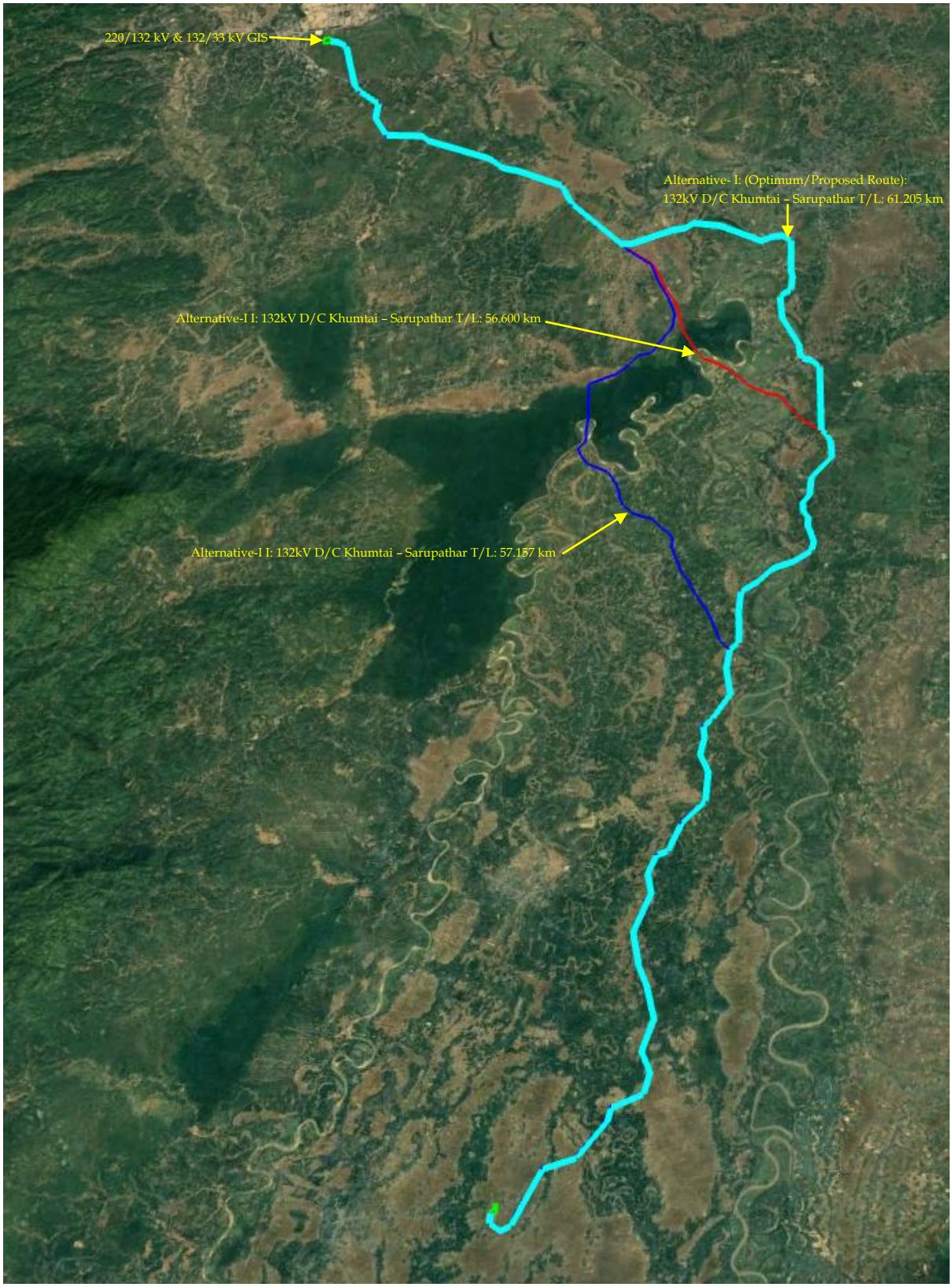


Table 5.1: Assesment of Alternative Routes

Description	Alternative- I (Optimum/Proposed Route)	Alternative-II	Alternative-III
220kV D/C SAMAGURI-MARIANI CKT I LILO Transmission Line			
Route Length (in Kms.)	10.167 km	10.127km	10.593km
Angle Point	35	20	25
River Crossing (Major)	NIL	NIL	NIL
River Crossing (Minor)	1 (Dhansiri River)	3	1
Forest (Reserved Forest & Protected Forest)	NIL	NIL	NIL
Tea Garden (Affected Route length)	3.50Km	3.50Km	3.50Km
Low Land Area	NIL	NIL	NIL
Affected Permanent structure	NIL	NIL	NIL
132kV D/C JORHAT WEST- BOKAKHAT LILO Transmission Line			
Route Length (in Kms.)	10.198 km	10.430km	10.564km
Angle Point	33	15	18
River Crossing (Major)	NIL	NIL	NIL
River Crossing (Minor)	3 (Dhansiri River)	3	3
Forest (Reserved Forest & Protected Forest)	NIL	NIL	NIL
Tea Garden (Affected Route length)	3.50Km	3.50Km	3.50Km
Low Land Area	NIL	NIL	NIL
Affected Permanent structure	NIL	NIL	NIL
132kV D/C Khumtai – Sarupathar Transmission Line			
Route Length (in Kms.)	61.205	56.600	57.175
Angle Point	200	175	178
River Crossing (Major)	NIL	NIL	NIL
River Crossing (Minor)	2 (Dhansiri River)	NIL	1 (Dhansiri River)
Forest (Reserved Forest & Protected Forest)	NIL	1 (Nambor Wildlife Sanctuary)	1 (Nambor Wildlife Sanctuary)
Tea Garden (Affected Route length)	9.500 Km	17.27 Km	13.31
Low Land Area	NIL	NIL	NIL
Affected Permanent structure	Nil (few temporary structure)	Yes	Yes

Source: Detailed Survey report

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 defence / 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.
- Buildings/ Storage areas for explosives or inflammable materials, bulk oil storage tanks, oil or gas pipelines, etc.

Pros and cons of the alignment options

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 sopting 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.

220kV D/C Samaguri-Mariani CKT I LILO Transmission Line

Alternative III is longest in length than Alternative I & II. Angle Point in alternative I is more i.e. 35 as compered to alternate II & III, i.e 20 & 25 respectively.

There are major River Crossing in all the three alternate routes. There is one minor river crossing in alternative I, whereas is three minor rivers crossing in alternativre II & one minor river in alternate III. Forest (Reserved Forest & Protected Forest), does not involved in all the three alternate routes.

There is no Low Land Area in all three alternate routes.

Length of Tea Garden (Affected Route length) in all the three alternate are same.

There is no Affected Permanent structure in all three alternate routes.

132kV D/C Jorhat West- Bokakhat LILO Transmission Line

Alternative III is longest in length than Alternative I & II. Angle Point in alternative I is more i.e. 33 as compered to alternate II & III, i.e 15 & 18 respectively. There are no major River Crossing in all the three alternate routes. There are three minor rivers crossing in all the alternatives. Forest (Reserved Forest & Protected Forest), does not involved in all the three alternate routes.

Length of Tea Garden (Affected Route length) in all the three alternate are same.
There is no Low Land Area in all three alternate routes.
There is no Affected Permanent structure in all three alternate routes.

132kV D/C Khumtai – Sarupathar Transmission Line

Alternative I is longest in length than Alternative II & III. Angle Point in alternative I is more i.e. 200 as compered to alternate II & III, i.e 175 & 178 respectively. There is no major river crossing in all the three routes. There are minor River Crossing in 2 locations of Dhansiri River in alternate I as compared to no minor river crossing in alternate II, where as one minor river crossing in alterate III. Alternative I does not involve any Forest (Reserved Forest & Protected Forest), as compared to alternative II & III.
There is no Low Land Area in all three routes.

Length of Tea Garden (Affected Route length) is higher in alternate II&III as compered to alternative I. There are Affected Permanent structure in alternate route II & III.

There is no Affected Permanent structure in Alternate I, apart from few temporary structures, whereas alternate II&III have Affected Permanent structure.

Justification for the selected alignment option

220kV D/C Samaguri-Mariani CKT I LILO Transmission Line

Length of Alternative I is slightly longer than alternate II, but involves only one minor river crossing, whereas is two minor rivers crossing in alternativre II. Based on above facts, Alternative I was considered as the most optimal route and is recommended for erection of transmission line.

132kV D/C Jorhat West- Bokakhat LILO Transmission Line

Length of Alternative I is less than alternate II&III. Alternative I was considered as the most optimal route and is recommended for erection of transmission line though Angle Point in alternative I is more i.e. 33 as compered to alternate II & III, i.e 15 & 18 respectively.

132kV **D/C Khumtai – Sarupathar Transmission Line**

Thoogh Alternative I is longest in length than Alternative II & III but does not involve any Forest (Reserved Forest & Protected Forest), Low Land Area as compared to other alternative routes. There is no Affected Permanent structure in Alternate I, apart from few temporary structures, whereas alternate II&III have Affected Permanent structure. Construction and O&M problems that are less anticipated in alternate I, as compared to alternative II&III. Based on above analysis, Alternative I was considered as the most optimal route and is recommended for erection of transmission line.

In addition to the above, during the check survey by EPC contractor, the alignment will again be fine-tuned with due consideration of the environmental and social parameters so that the final alignment is more feasible, economical and environment friendly.

6. ASSESSMENT FOR POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This chapter details the impact assessment methodology, anticipated project impacts on physical, biological environment (biodiversity assessment, critical habitat assessment using tools like AVISTEP etc.) and social environment based on baseline features of the project during design, construction and operation phases and mitigation measures for all identified impacts and provide summary of impact assessment.

6.2 Impact Assessment Methodology

Understanding of the project and selection criteria of transmission line with regards to environment and social consideration, different construction activities during different phases, social and environmental screening and scoping, Key baseline environmental and social features, identification of environmental and social impacts on physical, biological and social environment and their management plan along with institutional arrangements for implementation.

6.2.1 Screening and Scoping

Screening and Scoping involves review of the available environmental and social information about the project and its surrounding areas.

The details of the project have been collected from different project documents, secondary data and reconnaissance survey are summarized below.

Table 6.1: Screening for Impacts

Environmental and Social features	Description	Potential Impacts/ Impacts Occurred
Physical Environment		
Land use Land cover	In general, the land use of the study area, transmission line and tower footing are agricultural land / crop; Area for transmission tower: A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Linefor A type towers is approx. 71 to 147 sqm. B type towers is approx. 98 to 203 sqm., C type towers is approx. 122 to 241 sqm. and D type towers is approx. 184 to 358 sqm. B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line is DA type towers 169.77 sqm, DB type towers 46.57 sqm, DC type towers 171.47 sqm and DD type towers 185.26 sqm. C. Khumtai (AEGCL-New) – Sarupathar	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 large trees;

Environmental and Social features	Description	Potential Impacts/ Impacts Occurred
	(AEGCL-Existing) 132 kV S/C Line is DA type towers 995.75 sqm, DB type towers 181.5 sqm, DC type towers 289.75 sqm and DD type towers 659 sqm.	
Topography and Terrain.	The project is located in the Golaghat district of Upper Assam, is characterized by a predominantly monotonous, flat plain topography. The transmission line mostly passes through a flat/plain terrain.	-
Soil	Soil of Golaghat district is alluvial, black, Laterite; No major anthropogenic activities will be carried out in the area which may lead to soil contamination.	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	CGWB study for Golaghat district reveals that during pre-monsoon period water level marked up to 3.8 to 7.96 m bgl. During post-monsoon period water level marked above 3.31 – 6.89 m bgl; Rivers, ponds are rainfed and are used for domestic purposes by the villagers.	Insignificant stress on local water resources due to water requirement for the foundation activities, labour camp;
Drainage	Transmission line passing through river, nallah, ponds in many tower locations.	Sediment transport to nearby water bodies from tower locations.
Ambient Air Quality	Based on the observation at site it has been perceived that the ambient air quality of the project footprint and study area is good.	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	Habitats in the study area include agricultural / crop land, homestead	Removal of vegetation causing impact on ecology of the area;

Environmental and Social features	Description	Potential Impacts/ Impacts Occurred
	plantation, water bodies etc. 3 species of amphibians, 6 species of reptiles, 75 species of birds and 9 species of mammals were recorded / reported from the study area. Critically Endangered: Avifauna - 6 (Baer's pochard, Slender-billed Vulture, White rumped Vulture, White-bellied heron, Red-headed vulture and Bengal Florican). Endangered: Avifauna - 5 (Black-bellied Tern, Steppe Eagle White Winged Duck, Palla's Fish-eagle) Vulnerable: Avifauna - 7 (Swamp Francolin, Sarus Crane, River Tern, Pale-capped Pigeon, Indian Spotted Eagle, Greater spotted Eagle, Common Pochard) Near Threatened: Avifauna 21 (Alexandrine Parakeet, Ashy-headed Green-pigeon, Asian Woollyneck, Black necked Stork, Black-tailed Godwit, Blossom- headed Parakeet, Cinereous Vulture, Falcated Duck, Ferruginous Duck, Great Thick-Knee, Greater Adjutant, Grey headed Parakeet, Grey-headed Fish-eagle, Himalayan Griffon, Lesser Adjutant, Lesser Fish-eagle, Oriental Darter, Red-breasted Parakeet, Red-headed Falcon, River Lapwing, and Spot-billed Pelican). Least Concern: Amphibia -3, Reptilia – 6, Mammalia – 9 and Avifauna -31. As per Analysis for critical habitat within 5km, 10, and 50 km from the center line of T/L has been done by using authenticated maps of 9 numbers of Protected Area / Key Biodiversity Area has been found, one each (Garampani Nambor Doigrung WLS) is within 5km from the nearest point of transmission line.	Habitat destruction during temporary laying of wires adjacent to the RoW of transmission lines; Collision and electrocution risks to avifauna and other fauna during operational phases.
Occupational health and safety	--	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

Environmental and Social features	Description	Potential Impacts/ Impacts Occurred
		electric power lines during operation and maintenance.
Social Environment		
Demographics	220kV LILO of Samaguri - Mariani transmission line tower base is comprised of land from five villages. For Jorhat (West) to Bokakhat transmission line comprised of land from four villages and The study area of Khumtai to Sarupathar transmission line tower base is comprised of land from thirty-one villages. The other details shall be provided after conducting the socio-economic survey.	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 study area is agriculture based. Tea, rice and sugar cane are the main agricultural crops grown in the study area, with tea being is the largest agricultural industry. The Cultivators, Agricultural labourers comprise of 39.7% and 13.9% respectively. Out of total population of the study area, 45.0% are workers of which 56.9 % and 32.6 % are male and female respectively. The percentage of non-workers is 55.0 % in the in the study area. The workers are categorized as Cultivators, Agricultural Laborers, Household Industry Workers and Other Workers.	For the project activity more job opportunities will be created. Indirect positive impact on local economy through development of secondary amenities.
Land based, Livelihood	-	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 and the RoW of the transmission line will result in an impact on approx. 268 land owners. While the construction of towers is not likely to result in landlessness or physical displacement, it will result in crop losses during foundation, erection and stringing activities in the RoW.
Loss of CPRs, and Access,	The land within the RoW of the Transmission Lines is mainly of	• The loss of access and CPRs during the time of construction of

Environmental and Social features	Description	Potential Impacts/ Impacts Occurred
ights	Agriculture land, Tea Garden land and some fall on government land.	Transmission Line shall be provided after conducting socio-economic survey.
Community health and safety	Most of the tower locations is anticipated to be accessed through agriculture filed and compensation will be paid for the crop damage.	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.
Labour Welfare	The laboures would be engaged by the EPC contractor. The labourers would be engaged from both local and migrant workers from other districts of Assam.	The key potential impacts in terms of labour welfare include the following: Occupational Health and Safety 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 a source of impact which has been identified for detailed assessment for different stages of the project are 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 is 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 several 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 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 several 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

Significance Rating	Interpretation
	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 authorisation. 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 study area the land is primarily used for agriculture / crops (Tea Garden). The other land uses in the area are trees / vegetation, built up and water bodies (Table 2.3). No major anthropogenic activities are observed in the area except agricultural activities and tea crop. The project shall be resulting 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 of the 268 transmission towers which represent around 228.375 hectares. 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 as per the IS standards.
Impact Significance	A total of 228.375 hectares will experience permanent change in land use. The RoW of transmission line required 4092 numbers of trees including fruit & non fruit bearing, bamboos etc. to be cut. 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 this 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 228.375 hectares are primarily used for agriculture / crops (Tea Garden), trees / vegetation, built up, water bodies 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	No additional mitigation measures suggested.

mitigation measures	
Residual impact significance	Change in Land use at some tower locations is already happened and for remaining tower locations land use change will happen.
Soil Environment	
Context and receptor	Digging of foundation pits for the towers has 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 temporarily stored in a proper manner 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 properly at construction site, 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 268 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 minor.
Additional	No additional mitigation measures suggested.

mitigation measures	
Residual impact significance	No change in impact significance rating for remaining construction activities.
Ambient Air Quality	
Context and receptor	Ambient air quality will largely impacted 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 within 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; 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, SO2, NOx and CO2. 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 high 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 Noise Level	
Context and receptor	The foundation activities at transmission tower locations shall 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, 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, material transportation) at any tower location will 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 high 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 passes through River and nallahs at locations. Refer Table 2.3 for details.
Mitigation measure	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, Proper arrangement for clean bathing / washing water 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 septic tank and soak-pits.
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 negligible.
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 passes through River and nallahs at locations. Refer **Table 2.3** for

	details.
Mitigation measure	Drainage system should not be blocked by the construction activity.
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 low receptor sensitivity results in impact significance as negligible.
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; During tower erection and stringing activities, about 30-40 workers will be engaged.
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; 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. 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 ctivities, 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. Depending on the severity of incident/accident, the magnitude of impact could small to medium. As per the impact significant assessment matrix (refer Table 6.3) a combination of small to medium impact magnitude with medium receptor sensitivity results in impact significance as minor to moderate.
Additional mitigation measures	No additional mitigation measures suggested.
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 (i) 2 Schools, 1 Hospitals, 4 Places of worship, 1 Office and 1 Cultural Centre in LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S. /C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line; (ii) 2 Schools, 1 Hospitals and 2 Places of worship in LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line; (iii) 11 Schools, 1 Hospital, 10 Places of worship, 2 Offices, 1 Market places in Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C 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 conduceted during construction pahse 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 Aluminium oxide paint during operation and maintenance of the transmission line towers may impact soil quality.
Mitigation	Preventive maintenance plan will be prepared for transmission line.

measure	
Impact Significance	No impacts of any significance are predicted on vegetation and soil due to operation of the transmission line.
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 High receptor sensitivity results in impact significance as minor.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating.
Visual Impacts	
Context and receptor	The footprint of the project comprise of about 228.37 hectares will experience permanent change in land use and 81.57 km long transmission line with 268 towers. The transmission line route passes through agriculture / crops (Tea Garden), trees / vegetation, built up, water bodies 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 **negligible.**
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating.
Electro Magnetic Fields (EMPs)	
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 shall be provided in the project as per Electricity Act, 2003.
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 132kV & 220kV 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.

Residual impact significance	Not Applicable
Occupational Health and Safety	
Context and receptor	The project will have transmission of 132 kV & 220 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 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.
Impact Significance	Based on above, overall impact significance is assessed as **minor**.
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 significance	No change in impact significance rating.

6.4 Impacts on Biological Environment (Biodiversity Assessment, Critical Assessment Using Tools like 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 (tea garden) 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 *Gmelina arborea, Dalbergia sissoo, Mesua ferrea, Bombax ceiba, Dipterocarpus macrocarpus,*

	Azadiracta indica, Albizia procera, Butea monosperma, Cassia fistula, Tectona grandis, Ficus religiosa, Eucalyptus tereticornis, Areca catechu, Albizia lebbeck, Calotropis procera, Lantana camara, Argemone mexicana, Cassia tora, Chromolaena odorata, Celosia argentea etc. Apart from the above crops like rice, jowar, arhar, tur, moong, til, groundnut, soyabean, chilly and, ginger, onion, chilly, brinjal, bhindi, wheat, gram, mustard, turmeric, potato, carrot, pea. Other than cereals, fruits like mango, pineapple, orange, jackfruit, banana, litchi, lemon, papaya, sapota and guava are also grown in large quantity. Ground clearance will be maintained from the lowest cable and any object that is grounded (tree etc.). Clearing of vegetation from agriculture / crops (Tea Garden), trees / vegetation, built up and range land 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 neighbouring 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 to habitat disturbance for fauna. The clearance of vegetation in agriculture / crops (Tea Garden), trees / vegetation, built up, water bodies and range land 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. Several of the vegetation are 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 (Tea Garden), trees / vegetation, built up, water bodies and range land 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 (Tea Garden), trees / vegetation, built up, water bodies and range land habitats are included within the Least Concern category. However, the site has several bird species protected under IUCN conservation, therefore the site has been deemed to have **medium** sensitivity. The impacts described above is 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.
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 are 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 (Tea Garden), trees / vegetation, built up, water bodies and range land 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 dependant on agriculture / crops (Tea Garden), trees / vegetation, built up, water bodies and range land habitats (reptiles, birds and mammals) are included within the Least Concern category. However, the site has several bird species protected under IUCN Conservation Status and therefore the site has been deemed to have **medium** sensitivity. The impacts described above is 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 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.
Critical habitats of Critically Endangered and Endangered species	
Context and receptor	**Key Biodiversity Areas within 5 km:** The Garampani Nambor Doigrung WLS is within 1 km from Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line– 61.205 km. The species White-winged Duck (*Cairina scutulata*), Lesser Adjutant (*Leptoptilos javanicus*) are the Species triggering KBA criteria. Other KBA within 5km (Garampani Nambor Doigrung WLS); 10 km – (Garampani Nambor Doigrung WLS and Tirap – Patkai and Namphai); and 50 km – (East and North Karbi Anglong WLS, Kaziranga National Park, Gibbon (Hollongapar) Sanctuary, Majuli, Jhanjimukh – Kokilamukh, Dhansiri reserve Forest, Doyang Reservoir and Pangti Forest).
Mitigation measure	In order to mitigate and minimize collision of birds, power line markers will be used along the stretch of the transmission line nearby Nambor Doigrung Wildlife Sanctury, which will reduce the risk by increasing the visibility of overhead lines to birds.
Impact Significance	Based on above, overall impact significance is assessed as Moderate
Additional mitigation measures	A minimum ground clearance of 6.1 mtrs (height) have been provided to avoid the chance of animal/elephant electrocution in the project area.
Residual impact	No change in impact significance rating.

significance	

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.

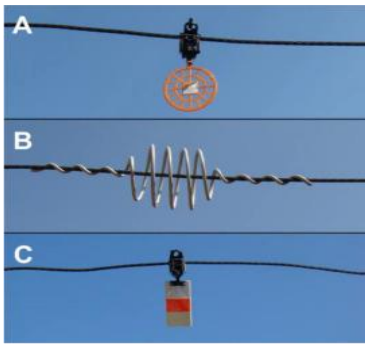
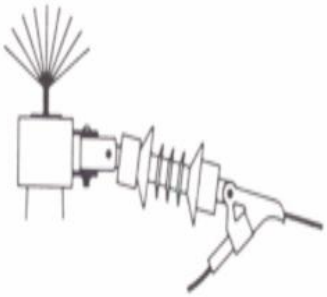
Impacts from the operation phase of the project on the local ecology have been assessed with respect to the following activities:

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 844 m and Spacing between the lines/cables is 3.05 to 5.49m, 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. Collision may happen for birds that make regular and repeated flights between roosting and feeding areas in proximity to power lines. Collision and electrocution hazard may happen at the stretch of the transmission line especially near Nambor Doigrung Wildlife Sanctuary. However, areas that are more vulnerable to avifauna are listed below: **Dhansahri River** A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km: **14A/0 - 14A/1.** B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line – 10.198 km: **5/0 to 5/1, 6/0 to 7/0 and 10A/0 to 11/0.** C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km- **453, 433 and 335.** Apart from the towers mentioned above; stretch nearby the water bodies is vulnerable to bird collision. Avifaual 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).

Collision and Electrical hazards for avifaunal species	
	In order to mitigate and minimize collision of birds, power line markers should be used (Picture 2) along the stretch of the transmission line nearby Nambor Doigrung Wildlife Sanctury, which reduce the risk by increasing the visibility of overhead lines to birds (Sporer *et al*. 2013). ***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, migratory birds *Anastomus oscitans, Aythya baeri, Ephippiorhynchus asiaticus, Aythya nyroca* etc. are recorded from the study area, which may collide when moving across water bodies in the study area. Some birds with large wing span, may get electrocuted. IUCN critically endangered / endangered species *Ardea insignis, Aythya baeri, Gyps bengalensis, Gyps tenuirostris, Houbaropsis bengalensis, Sarcogyps calvus / Aquila nipalensis, Asarcornis scutulata, Haliaeetus leucoryphus, Haliaeetus leucoryphus, Sterna acuticauda* are recorded from the study area that could cross the transmission lines provide species sensitivity assessed as **high**. However, it is unlikely that mortality from collision / electrocution will cause any changes in the population regionally. 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	
Context and receptor	Key Biodiversity Areas within 5 km: The Garampani Nambor Doigrung WLS is within 1 km from Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line– 61.205 km. The species White-winged Duck (*Cairina scutulata*), Lesser Adjutant (*Leptoptilos javanicus*) are the Species triggering KBA criteria. Other KBA within 5km (Garampani Nambor Doigrung WLS); 10 km – (Garampani Nambor Doigrung WLS and Tirap – Patkai and Namphai); and 50 km – (East and North Karbi Anglong WLS, Kaziranga National Park, Gibbon (Hollongapar) Sanctuary, Majuli, Jhanjimukh – Kokilamukh, Dhansiri reserve Forest, Doyang Reservoir and Pangti Forest).
Mitigation measure	In order to mitigate and minimize collision of birds, power line markers will be used along the stretch of the transmission line nearby Nambor Doigrung Wildlife Sanctury,

Collision and Electrical hazards for avifaunal species	
	nearby areas water bodies and river, which will reduce the risk by increasing the visibility of overhead lines to birds.
Impact Significance	Based on above, overall impact significance is assessed as Moderate
Additional mitigation measures	-
Residual impact significance	No change in impact significance rating.

6.4.3 Cumulative Impact for Avifauna

Crossing by the 220 kV S/C Samaguri – Mariani Line -I

220 kV S/C Samaguri – Mariani (Line -II) of AEGCL is crossing at tower location 3/0 – 3/1.

Crossing by the 132 kV D/C T/L from Sarupathar to proposed Khumtai S/S

132 kV S/C Maraiani – Bokajan T/L of AEGCL is crossing at tower location 50/0 – 51/0.
66 kV S/C Golaghat – Bokajan T/L of AEGCL is crossing at tower location 50/0 – 51/0.
400 kV D/C Maraiani – Misa T/L of PGCIL is crossing at tower location 52/1 – 51/2.

The presence of multiple transmission lines apart from Numaligarh Refinery Limted in the area can contribute to multiplying the impacts on the avifaunal species. Impacts to species are considered **moderate** as there is a possibility of impact to to resident faunal species as well as globally threatened migratory avifaunal species. etc.

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 Land owners in Tower Base Area and below conductors due to damages to Crops during Civil Works and Stringing Exercise	
Context and receptor	For 220kV LILO of Samaguri - Mariani transmission line the impact on tower base area will be approx. 0.16 Ha. of land from 5 villages. For Jorhat - West to Bokakhat transmission line the tower base area will be impacted on 0.15 Ha, of land from 4 villages. The tower base area has an impact on 0.85 Ha. of land from 31 villages in Khumtai to Sarupathar transmission line. There shall be no any physical displacement (loss of residential structure) for any private land owner which is assessed during the detailed survey. Moreover, there are no PCRs/CPRs or archaeological/historical sites. However, there are schools, an Anganwadi Centre (AWC), places of worship, and a veterinary hospital located beyond the Right of Way (RoW). But, the project activities did result in crop loss due to the following activities: • Due to civil work for foundation and tower erection activities including creation of access to tower location, soil excavation and movement of equipment and personnel; and • Due to Transmission lines stringing activities. While the exact extent of impact of the construction activities of the tower base (including civil work for foundation, erection and access road) holdings will be known

	after conducting the socio-economic survey. From the discussions with the land owners along the transmission line ROW, it is anticipated that the land owners were aware of the project. They knew the width of the RoW, the land use restrictions and their purpose and the compensation procedure. However, the land owners expressed apprehension about using the land in the immediate vicinity of the towers due to risks of injury or electrocution. The land owner identification for 220kV LILO of Samaguri-Mariani at Khumtai TL is yet to be carried out. Furthermore, the land owner identification for 132kV LILO Jorhat West -Bokakhat at Khumtai TL and132kV DC Khumtai-Sarupathar Transmission line is under progress. However, after finalization of the Land scheduling report from respective Circle Office, the compensation will be paid accordingly. The land for tower & right of way is not acquired and ownership of land remains with the owner and agricultural activities are allowed to continue after construction activity. However, compensation for tower base area and for tree and crop damages will be paid to the individual land owners as per compensation procedures. Further, in line with the MOP guidelines of October 2015 and subsequent notification by Govt. of Assam adopted the MOP guidelines of Oct.' 2015 on land compensation for tower footing and RoW Corridor on 10th March 2017 which provides for payment of 85% and 15% of land value towards compensation for land coming under tower base and line corridor respectively. Accordingly, compensation towards damage to tree/crop and land diminution value will be paid to affected persons after assessment of actual damage based on market rate and verification by concerned revenue authorities. On approval of compensation, the revenue officer shall further intimate the amount payable to the different land owners and AEGCL arranges the payment accordingly.
Embedded/ in built measures	One of the critical measures taken by the project during the details survey time was avoidance of structures, trees and water bodies, PCRs/CPRs as well as archeological/historical site during the identification of tower footing locations and RoW alignment. Furthermore, as has been mentioned in Section 2.5, the compensation payment will be made after approval of land scheduling details from concerned Circle Office which is under process. The compensation shall be paid as stipulated in Section 67 & 68 of the Electricity Act, 2003 read with Section 10 & 16 of Indian Telegraph Act shall be in addition to the compensation towards normal crop and tree damages. The crop compensation 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. 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 impact of construction activities along the tower base has resulted in a one-time crop loss. 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 lines 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 detailed survey. However, there are schools, an Anganwadi Centre (AWC), places of worship, and a veterinary hospital located beyond the RoW. The overall impact on land holdings in the RoW can be ascertained after conducting a socio-economic survey, which will be carried out after approval of the land scheduling report from the concerned Circle offices. Since most of the community members and villagers primarily depend on agriculture as a source of livelihood, the impact significance is considered minor.
Additional mitigation measures	In keeping with the Ministry of Power 2015 notification and Government of Assam Notification on land compensation for tower footing and RoW Corridor on 10th March 2017, AEGCL will pay compensation for the base area in between the transmission tower (between four legs) @ 85 % of the land value as determined by the District Authority or any authority based on circle rate/ guideline value/ stamp value/ stamp act. Moreover, utmost care shall be taken during check survey to avoid such areas. However, during excavation, if any treasure, archaeological artifacts are found the same shall be intimated in writing to Collector/Archaeology department as per the provisions of Section-4 of "Indian Treasure Trove Act, 1878 as amended in 1949". In addition to this, an Abbreviated Resettlement Action Plan shall be prepared for the entire transmission line route in keeping with applicable reference of Environmental and Social Management Planning Framework (ESMPF) requirements.
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 **Insignificant**
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 determine after conducting the socio-economic survey report, which will be carried out in due course of time after the approval of the land scheduling reports from concerned Circle Offices. 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 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 byland 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	Presently no compensation has been provided to the project affected families/land owners for tower base area along the RoW
Impact Significance	The land within the RoW is mostly used for agriculture purposes at present. The crops grown on this land are not high enough to impinge on the safety clearance distance. Hence, the current use of land for growing crops will continue. The road facing plots have a potential for non-agricultural use in the future. However, the restrictions on future land-use will have a permanent implication on use of these lands for non-agricultural purpose. Hence, the impact significance will be as **minor.**

Additional mitigation measures	In keeping with the Ministry of Power 2015 notification, and Government of Assam Notification on land compensation for tower footing and RoW Corridor on 10th March 2017, AEGCL will pay compensation for the base area in between the transmission tower (between four legs) @ 85 % of the land value as determined by the District Authority or any authority based on circle rate/ guideline value/ stamp value/ stamp act. In addition to this, an Abbreviated Resettlement Action Plan shall be prepared for the entire transmission line route in keeping with applicable reference of Environmental and Social Management Planning Framework (ESMPF) requirements. The land owners impacted shall also have access to the grievance redressal mechanism formulated for the Assam Intra State Transmission System Enhancement Project.
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.
Mitigation measures implemented	The provisions for safety of the workers will be complied as per the provision of the EPC contractor agreement.
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	The following risk mitigation measures are suggested to minimize the impact Ensuring that the contractor should follows the contractor EHS plan with provisions for monitoring of the EHS performance of their workers; and as part of the stakeholder engagement and information disclosure process, providing an understanding to the community concerning the activities proposed to be undertaken and the precautions being adopted for safety.
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 a significant number of workers during the foundation activities would hire from the local community.
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 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.
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. The assessment of loss will be done in the presence of the land owners.
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 repair. 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 **moderate.**
Additional mitigation measures	In addition to the embedded measures, an ARAP report will be prepared for the entire transmission line route, which will identify specific entitlements for crop loss. In addition to this, the local community members will have access the grievance redressal mechanism established by the project.
Residual impact significance	After the implementation of the additional mitigation measure, the residual impact significance is expected to be reduced to negligible.
Impact on Community Health and Safety	
Context and	The impacts on community health and safety during the operations phase are

receptor	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	• By 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.
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	Insignificant	Insignificant
Soil environment	Insignificant	Insignificant
Water resources and quality	Moderate	Minor
Drainage	Insignificant	Insignificant
Ambient air quality	Moderate	Minor
Ambient noise level	Moderate	Minor
Occupational health and safety	Moderate	Minor
Flora and fauna- vegetation Clearance	Minor	Minor
Flora and fauna- Construction Activities	Minor	Minor
Impact on Private Land owners in Tower Base Area and below conductors during Stringing Exercise	Minor	Insignificant

Category	Impact Significance (Without mitigation measures)	Significance (post-mitigation)
Impact on private land owners within RoW due to imposition of land use restrictions	Minor	Minor
Impact on local community due to loss of grazing land for Grid Sub-station	Negligible	Negligible
Impacts Due to Migrant Labour	Insignificant	Insignificant
Impact on Community Health and Safety	Minor	Insignificant
Impact on Economy and Employment in the Study Area	Optimistic	Optimistic
Operation Phase		
Soil Environment	Insignificant	Insignificant
Noise level	Minor	Minor
Visual Impacts	Insignificant	Insignificant
Electro-magnetic fields	No change in impact significance rating	
Health and safety	Minor	Minor
Flora and fauna- Collision and Electrical hazards for avifaunal species	Moderate	Moderate
Impacts of economic loss due to damage to standing crops during Maintenance work	Minor	Minor
Impact on Community Health and Safety	Insignificant	Insignificant

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.

The presence of multiple transmission lines {i.e 220 kV S/C Samaguri – Mariani (Line -II), 132 kV S/C Maraiani – Bokajan T/L, 66 kV S/C Golaghat – Bokajan T/L of AEGCL and 400 kV D/C Maraiani – Misa T/L of PGCIL} in the area apart from Numaligarh Refinery Limted can contribute to multiplying the impacts on the avifaunal species. Impacts to species are considered moderate as there is a possibility of impact to resident faunal species as well as globally threatened migratory avifaunal species etc.

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: The project will likely induce economic activity, including the creation of new businesses, increased investment, and job opportunities in the area. However, the economic benefits may be unevenly distributed, leading to potential socio-economic disparities within the community.

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 intensify the risk of flashovers.

Adaption: By using higher rated conductors HTLS, this sagging effect of transmission lines can be reduced.

Conductors made of material that can operate at higher temperatures yet cause 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, 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 is 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 conductors 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

The community consultations are carried out in all villages along the transmission line corridor with local habitants where sixty-four participants were participated in the three transmission lines to Khumtai S/s like economically communities, women, vulnerable groups and other local community leaders nearby the proposed transmission lines on 17th March,2023, 17th May,2023, 17th December, 2023 at 132 kV D/C Jorhat to West Bokakhat. Transmission line, 6th April,2023, 25th September, 2023, 17th February, 2024, 10th March, 2024, 6th April, 2024 at 132 kV D/C Khumtai to Sarupatha TL and on 28th June, 2023, 22th July,2023, 30th October,2023, 3rd January,2024, at 220kV LILO of Samaguri - Mariani at Khumtai Transmission Line. The details of the same is provided in Table 8.3 below

The transcript of these discussions will help AEGCL and EPC contractor for proper needs assessment to ensure the issues raised by people are addressed appropriately. Consultation will be carried out on an on-going basis throughout the sub-project cycle.

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 and when payment can be expected to receive by the PAF. Further, the PAF has shown their interest on 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 phographs are provided in **Appendix -5A & 5B.**

Keeping in mind the nature of the project and its setting, the key stakeholders groups have

been identified and listed in the table given below.

Table 8.1: Stakeholder Group Categorization

Category	Primary Stakeholder	Secondary Stakeholder
Community	• Project Affected Families/Land Owners of the transmission line • Local Community • Vulnerable community	• Opinion holders & • Community Leaders
Government Bodies/ Institutional Stakeholders	• Local Gaon Panchayats • Regulatory Authority • District Administration	• State Administration
Other Groups	• Contractors and sub-contractors • Labours/ Workers	

Table – 8.2: Summary of Public Consultation

Issues Discussed	People's views and perceptions
General Perception	Majority communities (including women) were aware of the construction of proposed Transmission lines. 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 to Khumtai S/s.
Support of local people for the construction of Transmission lines to Khumtai S/s.	Most of the communities expressed their support during implementation of the construction of proposed Transmission lines to Khumtai S/s. They are happy for contribution of Government of India's effort towards construction of proposed Transmission lines to Khumtai substation. Most of the communities expressed that there should be no adverse impact due to the construction of proposed Transmission lines to Khumtai substation.
Critical issue and concern by the local people for the proposed Transmission Lines to Khumtai substation locations.	Most of the communities expressed that there were no critical issues regarding the construction of proposed Transmission lines to Khumta substation.
Project site selection criteria (Proposed Transmission lines)	The community held the view that the project should avoid/minimize harm to vegetation's and places of community importance such as structure/CPR or community gathering places etc. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of construction of proposed Transmission lines to Khumtai substation.
Employment potential in the construction of proposed Transmission lines to Khumtai substation.	Across the communities, majority felt that, during construction/operation of the proposed Transmission lines to Khumtai substation there may opportunities to local unemployed people for self-supporting business activity like establishment of small hotel/tea stall/ grocery shop etc. Some of them requested that they should be involved not only in unskilled labour job but also in the supervisory work. They complained that the construction work is generally handed over to contractors who would bring their own labour force from outside. They hoped that instead of hiring people from outside the local people should be given employment. Some others felt that construction of Transmission lines under the project will ensure proper and

Issues Discussed	People's views and perceptions
	better power connection/ households' electricity as a result small and medium scale business can be started in the area.
Socio economic standing: land use, cropping pattern	The major sources of livelihood for the communities are agriculture, wage labour and small business. Most of the communities practiced one time cropping in a year, mainly paddy and vegetable cultivation.
Source of drinking water	The main sources of drinking water are hand pump and tube well. The other sources of drinking water is ring well. The availability of water is good as the water table remained high. However, in few people complained about the taste of the drinking water due to iron content in the water and thus they are using simple sand filter for portable use of water.
Negative impact on food grain, availability /land use	In general, the communities did not see any adverse impact on food/grain availability, as the constructions of proposed Transmission lines to Khumtai substation will be within the RoW of 27mts for 132 kV TL and 35 mts for 220kV TL The compensation for using the land in tower footing and RoW will be paid by AEGCL to private land owners.
Will project cause widespread imbalance by cutting fruit and commercial trees in the locality	The tress falling under the RoW of the Transmission lines will either cut or trim in the proposed Transmission lines to Khumtai S/S, the communities will be paid for the same as per government approved rate.
Will project cause health and safety issues	Most of the communities did not foresee any health or safety issues from the construction of proposed Transmission lines to Khumtai substation. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of proposed Transmission lines to Khumtai substation.
Protected areas	No protected area envisaged in the vicinity of the proposed Transmission lines.
Will project setting change migration pattern of animals	The communities consulted were conscious of the presence of migrant birds or animals in their localities and nearby proposed Transmission lines. They therefore anticipated that no any major impacts on animals, birds or their habitats from the construction of proposed Transmission to Khumtai substation.
Migration pattern	Majority of the communities reported outward migration of young generation especially the boys to big cities in search of work. The popular destinations of migration were Jorhat, Dibrugarh, Tinsukia, Guwahati for job as well as for factory jobs. There are very few cases of migration to capital cities of north eastern states in search of work.
Perceived benefits from project	Across the community's majority of them viewed that the construction of proposed Transmission line to Khumtai substation would contribute to minimize the prevailing energy crisis such as load shedding, and low voltage in the region. For some it will increase the rate of rural electrification and provide impetus to open small and medium business units in the area. At community level, the people hoped that project will address the problems of low voltage, and irregular power supply to the households.
Perceived loss	It will be temporary in nature due to loss of crops, trees and structure and can be compensated by AEGCL.

8.2 Continuous Consultatiion 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 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 2019.

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 mechanism 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 are organized at community level where the transmission lines are passing, typically at key points 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, 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 Assemese language are shall be available at the following locations.

GRC Tier 1:

1. PMU: Project Director,

Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in,
Contact Person: Mr. Pragyan Saikia

2. PIU (Refer Table, Page no 93)

This executive summary in English and Assamese can be found at the following locations:

1. PMU: Project Director,

Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in,
Contact Person: Mr. Pragyan Saikia
PIU: (Refer Table, Page no 93)

GRC Tier 2:

(i) Chief General Manager (CGM, PP&D), AEGCL
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in,
Contact Person: Mr. Pragyan Saikia
(ii) PMU: Project Director,
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in,
Contact Person: Mr. Pragyan Saikia
Tier 1: (Refer Table, Page no 93)
ESMPF is disclosed in AEGCL website: https://www.aegcl.co.in/aiib-project-details/

8.4 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 raised/discussed
1	17th March,2023	Discussion with local community at 132kV Jorhat to west Bokakhat transmission line	Kasupathar, Na-gaon	6 nos.	• Discuss with the local community about details of the project and understanding the project, the construction of proposed Transmission
2	6th April,2023	Discussion with local community at	1 no. Herheri	9 nos.	

Sl. No.	Date	Stakeholder Details	Location	No. of Participation	Issues raised/discussed
		132kV Khumtai to sarupathar transmission line	gaon, Amguri		lines works to Khumtai substation.
3	17th May,2023	Discussion with local community at 132kV Jorhat to west Bokakhat transmission line	Tamuli pathar, Bokakhat.	7 nos.	• Payment procedure of land compensation, Trees and crop compensation process to the landowners.
4	28th June, 2023	Discussion with land owners along the RoW of 220kV Samuguri to Mariani transmission line	Khumtai, Kasupathar	6 nos.	• Other impacts associated with transmission lines and approach to minimizing the impact.
5	22nd July,2023	Discussion with local community at 220kV Samuguri to mariani transmission line	Hawtali, Kasupathar	5 nos.	• The documents required to be submitted from the landowners for disbursement of Compensation for tower footing, RoW and zirat compensation, etc.
6	25th September, 2023	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Herheri Gaon, Hasua	4 nos	• 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).
7	30th October, 2023	Discussion with local community at 220kV Samuguri to mariani transmission line	Dohatia Gaon, Mariani	4 nos.	
8	17th December, 2023	Discussion with land owners along the RoW of 132kV Jorhat to west Bokakhat transmission line	Tamuli Pathar	5 nos.	
9	03rd January, 2024	Discussion with local community at 220kV Samuguri to mariani transmission line	Khumtai, Kasupathar	4 nos.	• Also informed the community that Grievance Redressal Committee is formed for the project, the local community may directly approach the Grievance
10	17th February, 2024	Discussion with local community at 132kV Khumtai to sarupathar	Barapathar, Damsamua, Hasua.	5 nos.	

Sl. No.	Date	Stakeholder Details	Location	No. of Participation	Issues raised/discussed
		transmission line			Redressal Committee if any grievances arise at site.
11	10th March, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Ikorani, Premhora, No tengrajan, Rongagarh	5 nos.	
12	6th April, 2024	Discussions with land owners along the RoW of 132kV Khumtai to Sarupathar transmission Line	Bengenakhowa Grant, Kathkotia	4 nos.	
13	13th May, 2024	Discussion with local community at 132kV Jorhat to west Bokakhat transmission line	Barahi Gaon, Sarkala Gaon	5 nos.	
14	04th May, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	No-2 Tengrajan, Kharua	4 nos.	
15	22nd May, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Nahor Bari, Baramukhia,	3 nos.	
16	11th June, 2024	Discussion with local community at 132kV Jorhat to west Bokakhat transmission line	Barchapari Gaon, Khumtai	5 nos.	
17	07th June, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Borchapori, Chakali	3 nos.	
18	03rd July, 2024	Discussion with local community at 220kV Samuguri to mariani transmission line	Helochi gaon, Khumtai- Nagaon	6 nos.	

Sl. No.	Date	Stakeholder Details	Location	No. of Participation	Issues raised/discussed
19	11th July, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Dapathar, Jamuguri Pankagaon,	5 nos	
20	07th August, , 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Kochari, Sipaibari	4 nos	
21	20th September, 2024	Discussion with local community at 220kV Samuguri to mariani transmission line	Leteku Chapori, Gandhi Gaon	4 nos.	
20	07th August, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Kochari, Sipaibari	4 nos	
21	20th September, 2024	Discussion with local community at 220kV Samuguri to mariani transmission line	Leteku Chapori, Gandhi Gaon	4 nos.	
22	10th September, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Dayang, Oating	5 nos.	
23	26th September, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Garigaon, Borpothorua	3 nos.	
24	07th October, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Kathkotia, Rangajan, Sarargaon	5 nos.	
25	22nd October, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Telia Gaon, Prajabasti	5 nos.	

Sl. No.	Date	Stakeholder Details	Location	No. of Participation	Issues raised/discussed
26	18th November, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Long Sesabil, No Doigrang	3 nos	
27	16th December, 2024	Discussion with local community at 132kV Khumtai to sarupathar transmission line	Gorkha gaon Khumtai	3 nos	

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 to 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 members should uphold the objectives of the GRM and strive to achieve them. The primary objectives of GRM are:

- Provide an accessible, transparent, efficient and predictable mechanism for resolution of grievances to all project 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 log 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 the grievances for redressal. They are

- 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)

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. 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.	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 smediate resolution of grievance. Accept and record grievances from community members. Facilitate the communication of the response of the GRC to complainants/ aggrieved. 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. HIV/AIDS/ Covid-19 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. Rape / sexual 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.

Common Grievance Categories	Issues and Likely Solutions
	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 / Covid-19 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) provides 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.

Complaints 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 will be assigned).
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.

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

Name of the T&T Circle	Name of the Project Districts	Pkg	Name of EPC Contractor	Sub Projects	Focal point / Nominated Official	Contact number (Mobile and WhatsApp)	Communication Address
Jorhat	Golaghat	D	M/s R. S. Infraprojects Pvt. Ltd. JV with M/s Parth Electricals	Khumtai S/S	Sri Mausam Deka, DM	8638612407	O/o The DGM, UATTC, AEGCL, LMTC, Garmur, Jorhat, 785007

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	Chairman	Assam Electricity Grid Corporation Ltd, (AEGCL) First Floor, Bijuli Bhawan Guwahati - 781001	Contact No.: 0361-2739520	Website: www.aegcl.co.in Mail Id: gm.eap@aegcl.co.in
2.	Project Director (EAP) Projects, AEGCL	Deputy Chairman		Mobile No.: 9859181640	
3.	Dy. General Manager (EAP), PMU, AEGCL	Member		Mobile No.: 7002649012	
4.	E & S Safeguard Specialist, PMU, AEGCL	Member		Mobile No.: 985433922	
5.	Project Related AGMs (EAP), AEGCL	Member		Mobile No.: 9706078551 9864602779 9864577672	

Sl no.	Designation	Position in the Committee	Communication Address	Website & Email id
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	hemant.bhave@feedbackinfra.com

If any 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 contactfor further needful action or the matter should be informed to AIIB immediately.

Grievance Register

Grievance Register	
Date of Grievance Recorded	*** The mobilisation 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 tea 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	AEGCL	-
Soil Environment	Digging of foundation pits for the towers has 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	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	Footprint tower foundation and RoW of transmission line	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	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 be generated by the construction workforce and labour camp site. A small proportion of the waste generated during construction phase	footings / foundations to be temporarily stored in a proper manner 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 properly at construction site, thereby reducing disturbance to surrounding standing crop and vegetation; The existing roads to be used for approaching tower locations.			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	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.				
Ambient Air Quality	Ambient air quality will be largely impacted 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 within 500 m distance from transmission line route. No ecological sensitivities located in the RoW of transmission line route.	All vehicles shall be properly maintained; 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.	Construction site and its associated facility location	PMC / AEGCL	Monthly
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.	Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm); Avoid unnecessary honking of horns.	Construction site and its associated facility location	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	During erection of tower and stringing there can be some disturbance from noise due to vehicular movement for transportation of tower components, strings, 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.				
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 nallahs at locations. 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, Proper arrangement for clean bathing / washing water to be made at labour camps; Approved water supply resource to be used for water	Construction site and its associated facility location	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		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.			
Drainage	The study area has natural drainage pattern. The transmission line passes through River and nallahs at locations. Impact on local water resources.	Drainage system should not be blocked by the construction activity.	Construction site and its associated facility location	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. 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;	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; 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.	Construction site and its associated facility location	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	During tower erection and stringing activities, about 30-40 workers will be engaged.	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			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		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			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		be kept at safe distance from construction site.			
Sensitive Receptors	There are 3 Schools & Colleges, 1 Hospital, 1 Places of worship and 1 Cultural Centre in LILO of 220 kV Samaguri – Mariani (AEGCL-Existing) S. /C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line; 2 Schools & Colleges, 1 Hospital and 1 Place of worship LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line; 20 Schools & Colleges, 3 Hospitals, 10 Places of worship, 2 Office, 1 Market place and 1 Bus Stop in Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line. During construction phase insignicant impact may occur to the above sensitive receptors.	Periodical EQMT for Noise Level at 7 locations (within 100 m from the center line of the T/L) will be carried out nearby these sensitive receptors during construction phase and all possible measures will be taken to minimize pollution level.	Sensitive Receptors (7 locations as per Table 4.1)	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	The project design specifications include the measures to reduce the noise generated along transmission line.	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	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.				
Visual Impacts	The footprint of the project comprise of about 228.37 hectares will experience permanent change in land use and 81.57 km long transmission line with 268 towers. The transmission line route passes through agriculture / crops (Tea Garden), trees /	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
	vegetation, built up, and water bodies. 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 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.	Project foot print	PMC / AEGCL	Monthly
Occupational	The project will have transmission of 132 kV &	Risks to general public during	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Health and Safety	220 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 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.	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 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 transmission line wise number of trees including fruit & non fruit bearing, shade trees of tea garden and bamboo etc. are as under: • 220kv Samaguri to Mariani- 357	In tower foundation location and transmission line corridor no mature fruiting tree or any other tree that is important for community will be felled.	Construction site and its associated facility location	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	nos. trees • 132kv Jorhat West to Bokakhat - 479 nos. trees • 132 kV Sarupathar to Khumtai - 3256 nos. trees 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 agriculture / crops (Tea Garden), trees / vegetation, built up and range land 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 neighbouring floral species, burrowing faunal species and foraging resources for herbivores in the area.	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.			
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	In-house training provided to the labour force and supervisory staff for situations dealing with wildlife encounters.	Construction site and its associated facility location	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	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.				
Operation Phase					
Collision and Electrical hazards for avifaunal species	Several species of birds 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.	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	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	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. However, areas that are more vulnerable to avifauna are listed below- **Dhansahri River** A. LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line – 10.167 km: Tower number -14A/0 - 14A/1. B. LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line – 10.198 km: Tower number -5/0 to 5/1, 6/0 to 7/0 and 10A/0 to 11/0. C. Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV D/C Line – 61.205 km- Tower number -453, 433 and 335. Apart from the towers mentioned above; either side of water bodies and river are vulnerable to bird collision.	reduce the risk by increasing the visibility of overhead lines to birds (Sporer *et al*. 2013).			

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 lines 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. The purpose of the ARAP is to ensure the restoration of livelihoods of the impacted PAFs. Also, a Stakeholder Engagement Plan will be prepared along with ARAP. Grievance Redressal Mechanism have 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	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
		shall be displayed at construction site. • 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. • Ensure access of the local community to a Grievance Redressal Mechanism	Transmission Lines	AEGCL / PMC	As specified in ARAP and GRM Reporting to AEGCL
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 transmissionline; • 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 toproject maintenance. • Ensure access of the local community to the GRMformulated for the project	All Tower Locations of transmission lines	AEGCL	Regular reporting at time of maintenance activities
	Economic Displacement- Loss of income sources	• Provide priority to the local community for any contractual opportunities during the operations phase; • Undertake skill training activities as part of the Abbreviated RAP for the project which would allow the community to undertake income generation activities outside the project as well.	All Tower locations of transmission lines	AEGCL	Monthly progress reports

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
	Risk to Community health and Safety	• Undertake health awareness programmes among the local community, • Ensure access to the local community to the GRM for the project.	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[4]	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, Adequate toilet and bathing facilities and their	Labour Camp	Monthly	IFC benchmark standards for workers accommodation	EPC Contractor	AEGCL / PMC

[4]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[4]	Standards	Implementation	Supervision
		maintenance, Adequate waste water disposal system, Source of cooking fuel, Adequate 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 / fever / any other) issues reported during the last month. Refer IFC Benchmark Standards for Workers Accommodation as **Appendix 6.**					
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	Transmission line	Monthly	As per specification and norms	EPC Contractor	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
		Implementation of Site Emergency Response Plan, Water consumption.					
Air Quality Monitoring	A. Pre-Construction Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind direction.	Near sensitive receptor sites (7 locations within 100 m from the center line of the T/L) as per Table 4.1)	One time	National Air quality standards of CPCB	EPC contractor 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 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 Contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Noise Level Monitoring	A. Pre-Construction Stage	Noise level (dB level) On hourly basis for 24 hours	Near sensitive receptor site (7 locations within 100 m from the center line of the T/L) as per Table 4.1)	One Time	CPCB standards for Noise and vibrations	EPC contractor Contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	Noise level (dB level) On hourly basis for 24 hours	Same location as selected during pre-	Twice a year/ noise assessments	CPCB standards for Noise and vibrations	EPC contractor by CPCB approved laboratory	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
			construction period	by demand			
	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 site (7 locations within 100 m from the center line of the T/L) as per Table 4.1)	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 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	Twice a year	National water quality standards of CPCB	EP EPC contractor C by CPCB approved laboratory	AEGCL / PMC
	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	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

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
		hardness, (as CaCO3), corrosivity, Taste).					
Soil Quality Monitoring	A. Pre-Construction Stage	PH, Sulphate (SO3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content.	Near sensitive receptor site (7 locations within 100 m from the center line of the T/L) as per Table 4.1)	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
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 substation locations	Transmission line routes	Continuous activity	Identification of carcass (animals/birds) to be reported to	Surveyor	AEGCL / PMC
	B. Construction	Visual Physical Inspection for	Transmission	Continuous		Contractor	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
	Stage	substation.	line routes	activity	concerned forest/wildlife authority for identification of species. Record to be maintained for number of carcasses		
	C. Operation Stage	Visual Physical Inspection for substation.	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 layout plan of selected substation area.	Transmission line routes	Once during detailed survey and layout design development	Documentary evidence to be maintained by surveyor for counting of trees.	Surveyor	AEGCL / PMC
	B. Construction Stage	Development of inventory of tress before initiating the substation 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

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
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 and attendance sheet also to be kept.	Contractor (Defect Liability Stage)/ AEGCL – Field Officers	AEGCL / PMC
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 redress 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, Concerned PIU, AEGCL – Field staff	GRC
	C. Operation Stage	Working files of GRC and GRM		Continuous	Notification of	Concerned field	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
		records.	Transmission line routes		formulation of GRM and GRC and display of GRM procedure in project locations. Working records for GRM.	staff, concerned PIU	
Compensation	A. Pre-Construction Stage	Identification of project affected people	Transmission line routes	During identification of land parcel of T/L	Compensation is to be paid as per RPF	-	-
	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), land acquisition (area m^2) –if applicable.	Transmission line routes			-	-
	C. Operation Stage	Marking of trees (enumeration) to 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	-		-	-

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency[4]	Standards	Implementation	Supervision
Livelihood	A. Pre-Construction Stage	Identification of any impact on livelihood due to acquisition of land, crop damage and zirat damage.	Transmission line routes	Once during identification of land parcel for substation.	Compensation is to be paid as per RPF	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 acquisition 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 envisaged during construction phase.	Transmission line routes	Once during identification of land Parcel for substation location.	Compensation is to be paid as per RPF	Revenue Department & AEGCL -concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC
	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 different line departments like

- Power Line Crossing location at tower no 52/1 – 52/2 (Gantry) in Garigaon village of 132 kV Khumtai-Sarupathar T/L, from PGCIL.
- River Corssing at Dhanssahri river at tower no 351 – 36/0, 63/0 – 64/0 and 78/0 – 78/1 in 2 no Herhari, Kathkotia and Long Sisabil villages respectively of 132 kV Khumtai-Sarupathar T/L, tower location no 14A/0 – 14A/1 of 220kV Samaguri – Mariani T/L and 5/0-5/1, 6/0-7/0 & 10A/0 – 11/0 of 132kV Jorhat West- Bokakhat TL from Water Resource Department.
- NH/SH Crossing at tower location no 67/1 – 68/0 in Rangajan village of 132 kV Khumtai-Sarupathar T/L, 17/0-18/0 of 220kV Samaguri – Mariani T/L and tower location no 13/0 – 14/0 & 4/1 – 5/0 of 132kV Jorhat West- Bokakhat TL from PWD department.
- Railway line Corssing at tower location no 47/0 – 48/0 at Railway station Oting & Jamguri of 132 kV Khumtai-Sarupathar T/L, 11/0 – 12/0 of 220kV Samaguri – Mariani T/L and tower location no 9/0 – 10 from N.F Railway.
- 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. As mentioned earlier, currently some construction activities are going on for tower foundation, hence budget heads for planning and construction stage are provided for remaining construction activities.

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 25.80 Lakhs** for ESMP implementation during Construction and O& M stage is provided in table below.

Table 10.5: Indicative Budgetary allocation for EMP Implementation

Sl. No.	Particulars	Capital Cost (Lumpsum INR in Lakhs)	Recurring Cost (Lumpsum INR in Lakhs) per Annum	Remarks
A. Construction Phase				
1.	Waste Management	**1.0**	**0.30**	Considered as part of EPC contractor work under Good Engineering Practise
2.	Environment, health and safety and Contractor's Environmental and Social Management Plan (CESMP) Implementation	**8.0**	**0.60**	
3.	EQMT (Ambient Air Quality, Noise Level, Water Quality and Soil Quality)	**2.8** (@ INR 6000/ Ambient Air Quality Sample, @ INR 3000/ Ambient Noise Sample, @ INR 5500/ Water Quality Sample, @ INR 5500/ Soil Quality Sample)	-	Considered as part of EPC contractor work under Good Engineering Practise
4.	Management Plan (Biological evironment) and Perch rejecter and power line markers	**12.00** Lakhs {8.00 Lakhs @ INR 1000.00 / unit of both Perch rejecter and power line markers for 3 circuit and 1 OPGW @ interval of 15 m (as per Central Electricity Authority) near Garampani Nambor Doigrung Wildlife Sanctuary, water bodies and river}	-	Considered as part of EPC contructor work under Good Engineering Practise for construction period under supervision of PMC and monitoring by AEGCL. AEGCL will take necessary measures during Operation period
6.	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

Sl. No.	Particulars	Capital Cost (Lumpsum INR in Lakhs)	Recurring Cost (Lumpsum INR in Lakhs) per Annum	Remarks
				conduct tree enumeration.
7.	**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 Three numbers Environmental Investigation Officers Three numbers Social Investigation Officers	-	-	Experts are on board as part of PMC contract.
	EPC One Environment, Health, Safety and Social Officer One Community Consultation Officer	-	-	Experts are on board as part of EPC contract.
	Sub – Total A	**23.80**	**0.90**	
B. Operation and Maintenance Phase				
1.	Waste Management	1.0	0.30	
2.	Environment, health and safety and EMP Implementation	1.0	0.50	
3.	Facility Management for Housekeeping	1.0	1.00	
	Sub – Total B	**3.00**	**1.80**	
	Total (Sub – Total A + Sub – Total B)	**26.80**	**1.80**	
	Social			
	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 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.

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 for projects funded by the Asian Infrastructure Investment Bank (AIIB) to streamline decision-making and provide more autonomy for project execution and delivery. The E&S staff of AIIB project is part of PMU which is headed by Project Director. At divisional level, the charge of E&S Officer is given to the concern's AGM. The AGM's will also act as project Manager for individual subprojects. The AGM's will work under the supervision of DGM at 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 **(templete in Appendix 7A)** 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 **(templete in Appendix 7B)** 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 **(templete in Appendix 7C)** 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 lustration of reporting line is provided in figure below.

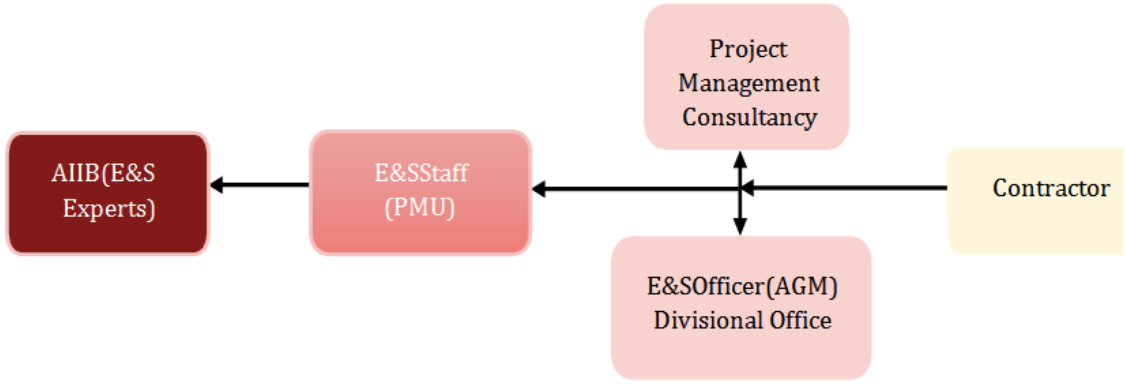


Figure-10.1: Illustration of Reporting Line

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 year. This report will demonstrate that sound environmental 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 staff, 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 safeguard 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.

Apart from these, training and capacity building programme are being 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 will be evaluated after conducting check survey and accordingly Abbreviated Resettlement Action Plan (ARAP) will be prepared

The **ESS 3** is applicable if indigenous peoples are present in, or have a collective attachment to, the proposed area of the project, and are likely to be affected by the project.

The various environmental and social attributes were idenfied through primary field study and secondary informations.

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 final check survey for the project is still underway, and the report will be updated after final check survey.

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

Public consultations were conducted with local habitants where sixty-four participants were participated in the three transmission lines to Khumtai S/s like economically communities, women, vulnerable groups and other local community leaders nearby the proposed transmission lines. Consultion 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 25.80 Lakhs** is estimated to be required for implementation of ESMP.

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

A - LILO of 220kV Samaguri – Mariani (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) – Samaguri (AEGCL-Existing) – S/C Line

Ap1 towards substation

Ap-1

Ap-3

Ap-17

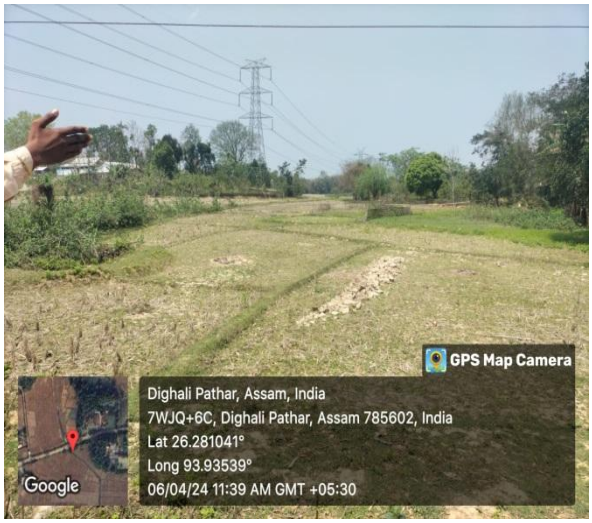
B - LILO of 132 kV Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL- New) S/C Line

Towards Ap-1

Towards Ap-2

C - Khumtai (AEGCL-New) – Sarupathar (AEGCL-Existing) 132 kV S/C Line

Ap-16



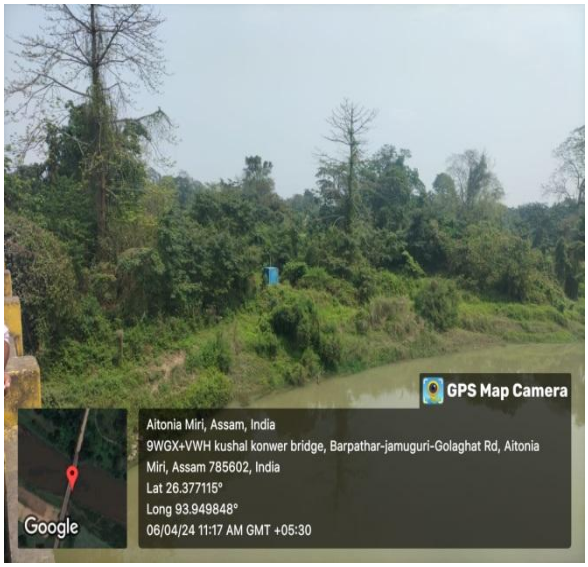
Ap-17

Ap-19

Ap-19/1

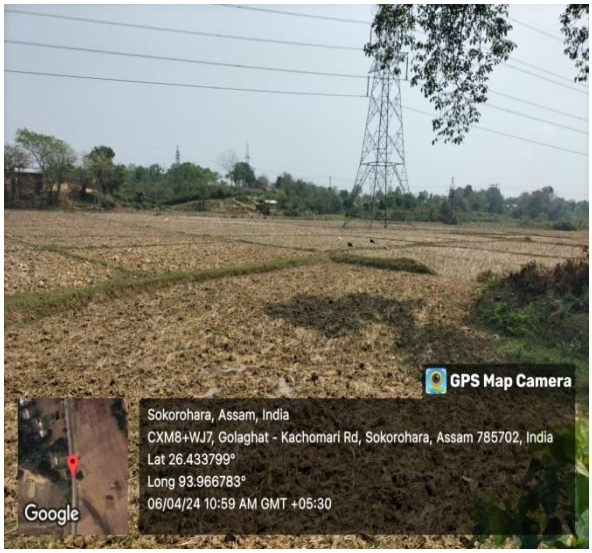
Ap-towards 20

Ap-35



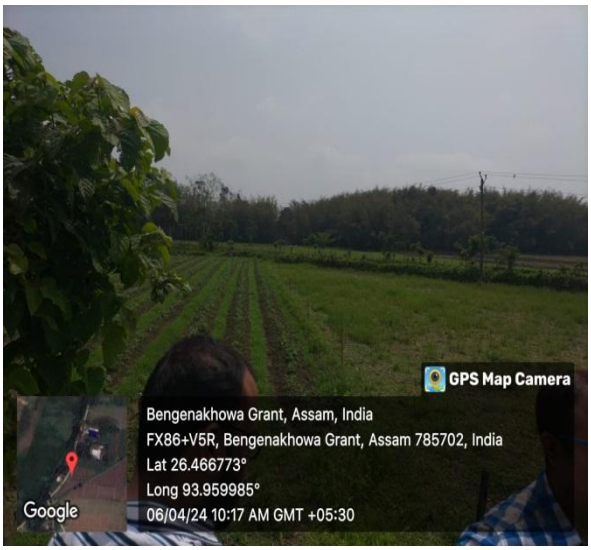
Ap-36

Ap-48 &49 Oatingbagan

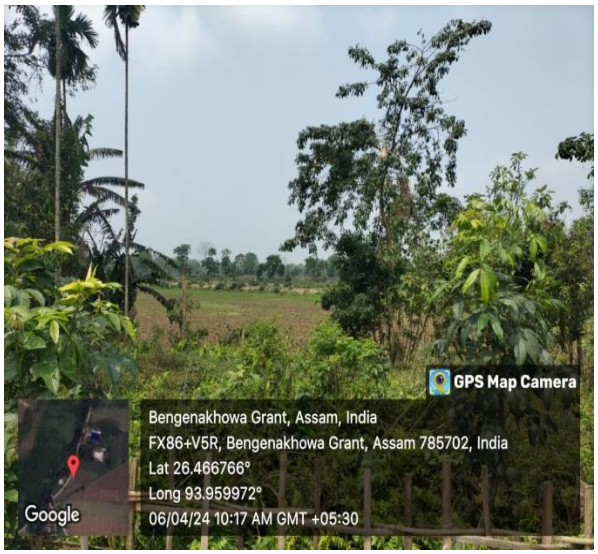


Ap-49 towards

Ap-55 towards



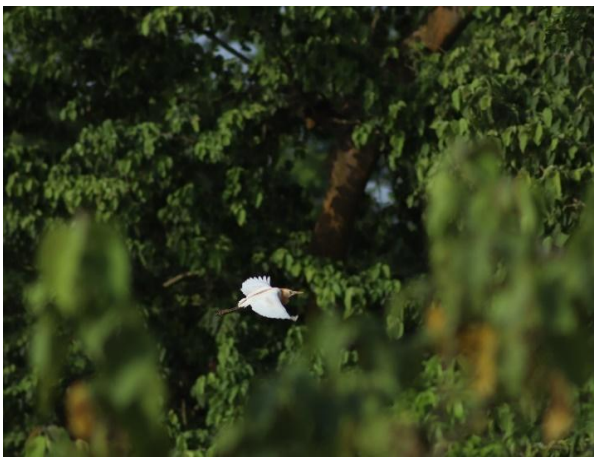
Ap-56



Ap-57

Ap-Sarupathar S/S

Little Cormorant



Indian Pond- heron

Red wattled Lapwing

Alexandrine Parakeet

Lesser Adjutant stork

Source: Site Visit during April 2024