NEPAL ELECTRICITY AUTHORITY

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

OF

SUPPLY AND INSTALLATION OF NEW 33 kV LINES

(Combined ESMP Final Report)

Submitted To:

Grid Solar and Energy Efficiency Project
Nepal Electricity Authority
Durbarmarg, Kathmandu

Prepared and Submitted by:

Environment and Social Studies Department
Lazimpat, Kathmandu
Phone No: 01-4435800, 01-4426772
Email: env.social@nea.org.np

June, 2022

ABBREVIATIONS AND ACRONYMS

CF	Community Forest
CFUG	Community Forest User Groups
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FY	Fiscal Year
GIS	Geographic Imaging System
GoN	Government of Nepal
GRC	Grievance Redress Committees
GSEEP	Grid Solar and Energy Efficiency Project
ha	Hectare
HHs	Households
km	kilometer
kV	Kilo Volt
m	meter
MC	Metropolitan City
M/RM	Municipality/ Rural Municipality
MOWRI	Ministry of Water Resources and Irrigation
MVA	Mega Volt Ampere
NEA	Nepal Electricity Authority
no.	Number
PA	Protected Areas
PAF	Project Affected Families
PAW	Project Affected Wards
RAP	Resettlement Action Plan
SEA/SH	Sexual Exploitation and Abuse/ Sexual Harassment
SS	Substation
TL	Transmission Line
VCDP	Value Chain Development Programme
WB	World Bank

Table of Content

Execituve Summary

Introduction

Grid Solar and Energy Efficiency Project has proposed the supply and installation of thirteen substations (one 33/11kV, 20/24 MVA substation, one 33/11kV, 3/8 MVA substation and eleven 33/11kV , 6/8 MVA substation) and 33kV new lines for energizing those substation. However, this study focuses on the study of 10 new 33/11kV transmission line (TL) in 10 districts (Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha districts) by utilizing the World Bank fund, in this regard an environmental and social management plan is required by the project's ESMF for implementing the project.

Objective

The objective of the Environmental and Social Management Plan (ESMP) is to identify the potentially significant environmental issues and risks of the proposed project and to suggest appropriate mitigation measures to mitigate and/or minimize the adverse impacts so that the project is implemented in an environmentally sound manner.

Study method

Literature review, public consultation with the community, local people, Project affected families (PAFs), household survey, group discussion with CFUG's, project-affected ward (PAWs) representative interview, walkthrough survey, geographic information system analysis were some important tools used for data collection.

Project Description

The sub-project sites lies in Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, and Dolakhadistrict. The Godrang-Devnagar 33kV TL passes through ward no 6,8, 9 and 12 of metropolitan. The total length of this 33kV TL is about 9.3 km.The Bhandara-Manhari 33 kV TL passes through ward no 1,2,3,4,5 and 6 of Rapti Municipality, Chitwan and ward no. 6,7 and 8 of Manhari Municipality, Makwanpur. The total length of this 33kV TL is about 24 km. The Hattisure-Raigaun 33 kV TL passes through ward no 3 and 4 of Bakaiya Rural Municipality and ward no. 1,4,7 and 8 of Bagmati Rural Municipality, Makwanpur District. The total length of this 33kV TL is about 32.55 km. The Markhu-Palung 33 kV TL passes through ward no 1 of Indrasarobar Rural Municipality and ward no. 1,2,3,4 and 5 of Thaha Municipality, Makwanpur. The total length of this 33kV TL is about 12.4 km.

The Chaughada-Kakani 33kV TL passes through 3 wards of Likhu RM (Ward no 4, 3, 5 and 6 respectively) and 2 wards of Kakani RM (Ward no 8 and 5). The total length of the TL is 12.225 km.The Malta-Unichaur 33kV TL passes through the ward no 3 and 5 of Bagmati Rural Municipality and ward no 2 of Konjyosom Rural Municipality, Lalitpur district. The total length of the TL is 11.66 km.The Rakathum-Katunje 33kV TLpasses through Khada Devi Rural Municipality; ward no.1, Sunkoshi Rural Municipality; ward no. 1, Timal Rural Municipality; ward no 5, 7, 8 and 9, Roshi Rural Municipality; ward no. 7, 8, 9 and 11 Namo Buddha Municipality; ward no. 5. The TL mainly passes along the B-P highway. The total length of the proposed transmission line is 21.7 km.The Bhalche-Jharlang 33kV TL passes through ward no 1 and 4 of Kispang Rural Municipality, ward no. 4 of Myagang Rural Municipality, Nuwakot and ward no 2, 3, 5 of Khaniyabas Rural Municipality, Dhading. The total length of the proposed transmission line is 38.3 km. The Jhurjhure-Mahabharat 33kV TL passes along the Bagmati Rural Municipality; ward no.4,5,9, Khanikhola Rural Municipality; ward no. 4,5, and 6, Mahabharat Rural Municipality; ward no 1.The Taraghari-Dudhauli 33kV TL passes through the ward no 3 of Katari Municipality, Udayapur, and ward no 7,8,9 and 10 of Dudhauli Municipality, Sindhuli district.

Existing Environmental and Social Setting

Physical environment

TL project lies in the different topographical, climatic, and geological setting of Nepal. The topography, landuse, climatic condition, geomorphology and geology, air and noise condition, watershed, and drainage pattern that shall be influenced due to the construction of the project has been discussed in the physical environment.

Biological environment

Vegetation and forest resources, mammals and birds, and rare and protected species of flora and fauna found in the subproject area are studied in a biological environment. The proposed projects mainly lie in the Upper tropical, Tropical, Sub-tropical, Lower tropical and temperate climatic region, which influence the presence of vegetation and wild animals.

Socio-economic environment

The subproject sites of proposed 33/11 kV TL alignment affects one metropolitan city, five municipalities and eighteen rural municipalities of ten districts of Nepal. The total area of the project affected wards is 1957.77 sq.km. According to CBS 2011, the total population of project affected wards is 2,39,163 with 1,13,545 male and 1,25,331 female.

Project Impact and mitigation measures

The project doesn't lie in any protected areas except for Godrang-Devnagar TLand Bhandara-Manahari TLAll the project has no significant impact in any sensitive ecosystem and has avoided areas of historical and cultural significance. The major impact of the transmission line projects is associated with clearing the vegetation, disturbance on agricultural land during construction, waste management of the labor camp, occupation, and community health safety during construction. However, agricultural land under RoW will be only restricted for construction and allow for cultivation. Most of the impacts associated with the construction of the projects were limited and can be addressed and are temporary in nature.

Environmental management activity

This environmental management/mitigation plan would provide clear guidance to the project authority and contractor on when and how the mitigation measure should be implemented.

Environmental Monitoring Plan

NEA/ESSD is responsible for regular monitoring and reporting of the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will also include assessment of projectlevel impactsregularly.

Reporting

NEA/ESSD is responsible for regular monitoring and reporting on the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will be carried regularly

1 Introduction

1.1 Background

Nepal Electricity Authority (NEA) is the central organization established in 2042 B.S as an undertaking of the Government of Nepal. It is the national organization under the Ministry of Water Resources and Irrigation (MOWRI) which is involved in the generation, transmission and distribution of the electricity in the country and is responsible to make electricity available to all consumers within Nepal through central grid operation.

Over the decade, NEA's operations have suffered from high level system loss and poor system performance at the peak demand. The network voltages remain excessively low in many parts of country. The major cause of the low system voltage has been identified as lack of required number of the distribution system and high system loss. The network supplying the system is heavily overburdened and has exceeded technical and economic loading level at many places causing the deficit voltage power to consumer. In this context, NEA- Grid solar and energy efficiency project (GSEEP) project funded by World bank have proposed the construction of 10 new 33/11 kV transmission line in different district of Nepal, to support the Nepal power supply network, increase the system efficiency, reduce the system loss and provide ease access of electricity to the community.

As per the Environment Protection Rule 2020, environmental studies are not required for the implementation of 33kV transmission line and 33/11kV substation. Grid Solar and Energy Efficiency Project has proposed the supply and installation of thirteen substations (one 33/11kV, 20/24 MVA substation, one 33/11kV, 3/8 MVA substation and eleven 33/11kV , 6/8 MVA substation) and 33kV new lines for energizing those substation. However, this study focuses on the study of 10 new 33/11kV transmission line (TL) in 10 districts (Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha districts) by utilizing the World Bank fund, in this regard an environmental and social management plan is required by the project's ESMF for implementing the project. Implementatoin of project would augment the system capacity which would consequently reduce the load shedding hours to some extent and improve the revenue collection for unutilized usable energy.

The proposed TL alignmentshave been selected in a way to avoidthe settlement areas, inbuilt structures, religious places, schools, and other community structure, wherever possible. During

the field study of these projectsthese alignments were devoid of any obstructionsfor the erection of poles and transmission lines. .

This ESMP isintended to provide guidance to NEA-GSEEPto avoid or minimize any kind of impacts during the construction period as well as post-construction phase of these projects. The measures focus on environmental issues (such as air and noise pollution, biodiversity loss, and land-use change) and social aspects (such as avoiding potential loss of land due to pole installation, protection of sites with social and cultural values and significance, consideration of local stakeholder's need as well as the safety of workers and communities). This ESMP also provides an overview of the E&S measures that should be put in place during subproject implementation to ensure effective execution of planned measures and commitments, including roles and responsibilities of the PIA/Implementation Consultant and the Contractor. The environmental and social management plan (ESMP) prepared for this project includes 10 new 33kV TLs proposed are Godrang-Devnagar, Bhandara-Manhari, Markhu-Palung, Hattisure-Raigaun, Kakani-Chaturale, Malta-Unichaur, Rakathum-Katunje, Bhalche-Khaniyabas, Taraghari-Dudhauli, Jhurjhure-Mahabharat.

1.2 Objectiveand Scope of the Study

The objective of the Environmental and Social Management Plan (ESMP) is to identify the potentially significant environmental issues and risks of the proposed project and to suggest appropriate mitigation measures to mitigate and/or minimize the adverse impacts so that the project is implemented in an environmentally sound manner. The other specific objectives of the study are:

- Preparation of project location map showing the project area in map of Nepal and route alignment passing through municipalities/rural municipalities
- Preparation of project accessibility map
- Preparation of route alignment map with pole location and substation site in GIS
- Preparation of route alignment map along the alignment and affected rural municipalities
- Preparation of geological map of the project area
- Landuse and landuse pattern of the transmission line alignment
- Topographic and geomorphology – Landscape and topographic condition of the alignment.
- Geological: General geological information of the region and project area

- Existing and proposed developments like road, transmission line, settlement, and as well as other facilities such as schools, health services, markets etc.
- Vegetation/forest resource along the alignment, including forest type, category, major species associated species
- Identify the plant species found along the alignmentincluding their conservation status and ethnobotanical uses.
- Collect the information about the wildlife found in the project area including their important habitat, conservation status, and occurrence in the project area
- Identify the agricultural land and forest areas along the alignmentas per forest category (Government, community, private, leasehold, and religious)
- Data encoding and analysis
- Identification of positive and adverse project -triggeredenvironmental amd social risks and impacts during construction and operation phases
- Identify and recommend most appropoate mitigation measures to offset the risks and impacts along with respomsbile agencies for implementation, timeline and recources and
- Preparation of Environmental and Social Management Plan report showing details of the monitoring parameters, schedules, locations, methods. The plan shall also specify manpower requirement, organization, grievances management and budget.

1.3 Study Methodology

For the preparation of this ESMP of the proposed ten 33 kV TL projects, different methods and approaches were adopted for information collection. These included literature review, consultation with the community, local people and the Project affected families (PAFs), household survey, group discussion with CFUG's, and interviews with therepresentative of the project-affected ward (PAWs), walkthrough survey, and geographic information system analysis etc. were some important tools used for data collection. The key methodologies applied for preparing this ESMP study are discussed below;

1.3.1 Desk study

Review of published literature related to ESMP sites, , review of the TL in google earth, the study of a topographic map, geological map, land-use map, Rural Municipality/Municipality profile, ward profile, Centre Bureau of Statistic data, analysis of primary data collected in field survey,etc.

1.3.2 Field Investigation

The field works involved identification of TLroutes, investigation of the physical, biological, socioeconomic, and cultural aspects of proposed project-affected wards, household survey with PAFs, Ward level PRA in the project-affected ward by a team of experts,The tasks also included identification of positive and negative environmental and social impacts of the transmission lines, consideration ofappropriate mitigation measures and devising environmental and social monitoring plans with the purpose of tracking the issues on time and addressing them properly.

1.3.3 Public Consultation

Public consultations covered different activities such as conducting meeting with therepresentatives of the ward office, affected Community Forest User Groups (CFUGs), local institutions, local people, indigenous people, key informants, capacity building needs of various implementing entities and development of of skill training plans for the project affected familes.

Altogether, a total of 155 consultations(with community, institutions, wards, M/RM offices, CFUGs) were held in all subproject sites with a total of 1243 people (955 male, 288 female) who participated in the consultative meetings. The details of the meetings held in different sites including the list of participants and suggestions are attached in Annex I.

Table No.1 : Detail of the consultation meetings held at project sites

S.N.	Project site	No. of consultation	Total	Male	Female
1.	Godrang-Devnagar TL	11	90	69	21
2.	Bhandara-Manahari TL	24	223	167	56
3.	Markhu-Palung TL	12	107	79	28
4.	Hattisure-Raigaun TL	26	235	183	52
5.	Chaughada-Kakani TL	4	20	15	5
6.	Malta-Unichaur TL	10	67	59	8
7.	Rakathum-Katunje TL	26	150	121	29
8.	Jhurjhure-Mahabharat TL	16	121	101	20
9.	Bhalche-Khaniyabas TL	13	117	85	32
10.	Taraghari-Dudhauli TL	13	113	76	37
Total		**155**	**1243**	**955**	**288**

Source: Field Survey

The major issues discussed during the consultations were: i) likely impacts and loss of private lands/assets by the the TL lines ii) measurues to minimize the losses or damage of lands and crops during construction iii) finding ways to reach amicable salutations incase of disputed sites iv) informed consultations with the affected parties and v) enhanced participation of locals/affected members in consultations.

1.4 Layout of the Report

ESMP has been structured in five chapters, they are as follows:

Chapter 1: Introduction

Provide the Introduction of the project, its implementing agencies, objectives of the study, scope of the study, and study methodologies.

Chapter 2: Project Description

It describes the project location, TL area, TL features, and construction planning.

Chapter 3: Existing Environmental and Social Setting

It outlines the existing environmental and social baseline condition of the project affected wards, district.

Chapter 4: Project Impact and Mitigation Measures

It describes the project impact on the environment and social aspect of the project implementing location, impact matrix, and adopted mitigation measures to cope with impact govern by a project in the environmental and social dimension of the location.

Chapter 5: Environmental management activities and organization setup

It outlines the environmental and social impactsalong with the mitigation measures, , permits and approval for tree clearing, land use requirements for erecting poles, relocation of infrastructure etc. This chapter also highlights the measures to avoid potential loss or impacts on land/housesor other facilities along TL- RoW, , compensatory plantation plan, health, and safety plan, grievances redress plan. The chapter also proposes the Environmental monitoring plan, institutional arrangement, and mechanism of monitoring, Environmental management cost, and reporting.

2 Project Description

2.1 Project Location

Godrang-Devnagar 33kV TL of Chitwan District

The proposed Godrang-Devnagar 33kV TL will be constructed to run the proposed Devnagar SS (33/11kV, 20/24MVA) of Bharatpur Metropolitan City, ward 6, Devnagar of Chitwan district. The transmission line passes through ward no 6,8, 9 and 12 of metropolitan. The total length of this 33kV TL is about 9.3 km. The TL passes along the Tikauli Community forest. The TL passes through 0.94 ha of forest area, 1.4 ha of agricultural land, 1.5 ha nearby settlement area, 0.65 ha of grassland and 0.98 ha of barren land. About 0.94 ha of the forest land within the RoW of the TL alignment is managed by community/government forest. The major part of the proposed TL run parallel to the existing earthen/black topped road (Beeshazari-Gitanagar road). The nearest settlement along the TL are Godrang, gauriganj, tharu gaun, indrapuri, gitnagar, Shiva Mandir Tole, Bageshwori Tole, Bishhazari Simsar Tole, Dakshinkali Tole, Bishhazari Tole, Bandevi Tole, Salyani Tole, Sansari Devi Tole, ShivaShakti Tole and tikauli.(within the 200m from the TL project)

Bhandara-Manhari 33kV TL of Makwanpur District

The proposed Bhandara-Manhari 33kV TL will be constructed from Hardi Substation, Bhandara to run the proposed 33/11kV 6/8 MVA Manhari SS,located at Manahari Rural Municipality-08, Beluwatole, Makwanpur District. The transmission line passes through ward no 1,2,3,4,5 and 6 of Rapti Municipality, Chitwan and ward no. 6,7 and 8 of Manhari Municipality, Makwanpur. The total length of this 33kV TL is about 24 km. Most of the section of TL runs along the E-W highway. The TL passes through 0.9 ha of community forest area, 1.4 ha of agricultural land, 8.5 ha nearby settlement area and barren land, 2.6 ha of grassland and 0.7 ha of river/sand. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlements along the TL are Gadimai, Madahardi, Bhandara Bazar, Kanchan Basti, Om Kareshwor, Naharbazar, Manakamana Chowk, Laxmi Narayan Chowk, Shivapuri, Shivapur, Karalaya, Pachase, Simal Chowk, Sajha Chowk, Mahakali Tole, Bamasdharti Tole, Panchakanya Tole. (within the 20-200m from the TL project)

Hattisure-Raigaun 33kV TL of Makwanpur District

The proposed Hattisure-Raigaun 33 kV TL will be constructed from Hattisure Substation to run the proposed 33/11kV 6/8 MVA Raigaun SS, located at Bagmati Rural Municipality-01, MakwanpurDistrict. The transmission line passes through ward no 3 and 4 of Bakaiya Rural Municipality and ward no. 1,4,7 and 8 of Bagmati Rural Municipality, Makwanpur District. The

total length of this 33kV TL is about 32.55 km. Major section of the TL runs along the Hetauda-Faparbari road. The TL passes through 0.56 ha of community forest area, 0.75 ha of agricultural land, 13.77 ha nearby settlement area and barren land, 1.97 ha of grassland and 2.3 ha of river/sand. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL are Hattiban, Mulkhola, Garberi, Triveni, Bhaise, Akash Tole, Laiguras, Bankai, Lamitar, Budha Darsan, Hattisure, Jhaljhale. (within the 20-200m from the TL project)

Markhu-Palung 33kV TL of Makwanpur District

The proposed Markhu-Palung 33kV TL will be constructed from Markhu Substation to run the proposed Palung SS (33/11kV, 6/8 MVA) located at Thaha Municipality-02, MakwanpurDistrict. The transmission line passes through ward no 1 of Indrasarobar Rural Municipality and ward no. 1,2,3,4 and 5 of Thaha Municipality, Makwanpur. The total length of this 33kV TL is about 12.4 km.The proposed TLpasses alongShera to mohini jharna road, Tasar to Khola kharga road and Palung Agro Motor bato via Tribhuwan Highway.The TL passes through 0.75 ha of community forest area, 1.79 ha of agricultural land, 2.78 ha nearby settlement area and barren land, 0.77 ha of grassland and 1.21 ha of river/sand. The affected forest land within the RoW of the TL alignment is managed by community/government forest.The nearest settlement along the TL project are; Markhu, Dalchin Pakha, Damdhunga, Sundarghari, Suntala ghari, Palung, Tasar, Gahate dada, Okharbazar, Thaha Bazar, Palung, Phat bazar which are from 20 m to 400 far from the TL project.

Chaughada-Kakani 33kV TL of Nuwakot District

The proposed Chaughada-Kakani 33kV TL will be constructed from Chaughada to run the proposed Kakani substation (33/11kV, 6/8 MVA) located at Kakani Rural Municipality-07, Nuwakot District. The proposed transmission line passes through 3 wards of Likhu RM (Ward no 4, 3, 5 and 6 respectively) and 2 wards of Kakani RM (Ward no 8 and 5). The Right of Way (RoW) of the transmission line is 6m (3m on each side of centerline). The TL mainly passes along the Likhukhola-Chaugada road. The total length of the TL is 12.225 km.The TL passes through 3.3 ha of community forest area, 3.2 ha of agricultural land, 0.22 ha nearby settlement area and barren land, 0.33 ha of grassland and 0.18 ha of river/sand. The affected forest land within the RoW of the TL alignment is managed by community/government forest.The nearest settlement along the TL project are; Sangam Chowk, Bagaicha, Gaekhar, Pakhare, Chap Gaun, Chaugada Bazar, Siddhiganesthan, Majula, Ramrajya, Thumpka, Birali Danda, Bhangeriwhich are within 400 far from the TL project.

Malta-Unichaur 33kV TL of Lalitpur District

The proposed Malta-Unichaur 33kV TL will be constructed from Malta SS to run the proposed Unichaur substation (33/11kV, 6/8 MVA) located at Mahankal Rural Municipality-01, Lalitpur District. The proposed Malta - Unichaur 33kV TL passes through the ward no 3 and 5 of Bagmati Rural Municipality and ward no 2 of Konjyosom Rural Municipality, Lalitpur district. The nearest access for the proposed Transmission line is from kanti lokpath road and Madhyawarti road, Yaspa-ikudhol-Magargaun rural road. The total length of the TL is 11.66 km.The TL passes through 5.2 ha of community forest area, 0.32 ha of agricultural land, 0.97 ha nearby settlement area and barren land, 0.29 ha of sandy area and 0.07 ha of river. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL project are; Kalche Gaun, Bhatedada, Ikudol, Devisthan, Yaspa, Bhakaridada, Sankhu, Unichaur.

Rakathum-Katunje 33kV TL Kavrepalanchowk District

The proposed Rakathum-Katunje 33kV TL will be constructed from Rakathum SS, Khadadevi RM-01, Ramechhap to run the proposed new Katunje SS (33/11kV, 6/8 MVA) located at Katunje, ward no. 7 of Roshi Rural Municipality of Kavre district. The proposed TL passes through Khada Devi Rural Municipality; ward no.1, Sunkoshi Rural Municipality; ward no. 1, Timal Rural Municipality; ward no 5, 7, 8 and 9, Roshi Rural Municipality; ward no. 7, 8, 9 and 11 Namo Buddha Municipality; ward no. 5. The TL mainly passes along the B-P highway. The total length of the proposed transmission line is 21.7 km. The TL passes through 1.2 ha of community forest area, 5.1 ha of agricultural land, 2.9 ha nearby settlement area and barren land, 1.5 ha of river area and 2.1 ha of grassland. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL project are Katunje, 400 Gau, Kami Danda, Nepalthok, Aaapghari, Gajulidaha, Mangaltar, Karam Danda, Kaldhunga.

Bhalche-Khaniyabas 33kV TL of Dhading District

The proposed Bhalche-Jharlang 33kV TL will be constructed from Bhalche SS, Kispang RM-01, Nuwakot district to run the proposed Jharlang SS (33/11kV, 6/8 MVA)located at Jharlang, ward no. 2 of Khaniyabas Rural Municipality of Dhading district. The proposed Bhalche-Khaniyabas 33kV TL passes through ward no 1 and 4 of Kispang Rural Municipality, ward no. 4 of Myagang Rural Municipality, Nuwakot and ward no 2, 3, 5 of Khaniyabas Rural Municipality, Dhading. The proposed TL mainly follows Myagang-Bachala Feeder Road, Solay-Deurali Feeder Road, Chamsapa Road and Bachala-Jharlang Road. The total length of the proposed

transmission line is 38.3 km. The TL passes through 13.7 ha of community forest area, 1.6 ha of agricultural land, 5.78 ha nearby settlement area and barren land, 0.07 ha of river area and 1.8 ha of grassland. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL project are Bhalche, Thulo Gau, Ghale Gau, Gunsa Gau, Kingtang, Gangmang, Paldegang, Chamgang, Pachet, Kokhim, Nayabasti, Kalangma, Lemsigang, Manegau, Temrang, Bragu, Kuri, Singang, Bachala, Goisi, Patigau, Archet, Maurgau.

Jhurjhure-Mahabharat 33kV TL of Kavrepalanchowk District

The proposed Jhurjhure-Mahabharat 33kV TL will be constructed by tapping it from Jhurjhure, Bagmati RM-04, Makwanpur (Hattisure-Raigaun 33kV TL project) to run the proposed Mahabharat SS (33/11kV, 3/8 MVA) located at Gokule, ward no.1 of Mahabharat Rural Municipality of Kavrepalanchowk district. The proposed TL passes along theBagmati Rural Municipality; ward no.4,5,9, Khanikhola Rural Municipality; ward no. 4,5, and 6, Mahabharat Rural Municipality; ward no 1.The proposed TL mainly follows Jyamire-Bhorleni-Taldhunga Feeder Road, Khopasi-Taldhunga Road, Taldhunga-Jagthali-Gokule Road.The total length of the proposed transmission line is 22.25 km. The TL passes through 1.5 ha ofcommunityforest area, 3.1 ha of agricultural land, 6.43 ha nearby settlement area and barren land, 1.6 ha of river area and 1.02 ha of grassland. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL project are Jhurjhure, Jyamire,Lilaban, Bageri, Takey, Bhorleni, Sikrey Baldev, Farsa, Thulo Baldev, Goth Danda, Aaap Danda, Aangarey, Taldhunga, Ratmate, Majhitar, Nagpani, Mandir Danda, Thade, Jagthali, Fuldanda etc.

Taraghari-Dudhauli 33kV TL of Sindhuli District

The proposed Taraghari-Dudhauli 33kV TL will be constructed from Taraghari SS, Katari Municipality-03, Udayapur to run the proposed Dudhauli SS (33/11kV, 6/8 MVA)located at Srijana nagar, Dudhauli, ward no. 10 of Dudhauli Municipality of Sindhuli district. The proposed Taraghari-Dudhauli 33kV TL passes through the ward no 3 of Katari Municipality, Udayapur, and ward no 7,8,9 and 10 of Dudhauli Municipality, Sindhuli district. The proposed TL mainly follows Madan-Bhandari Lok Marga and Sidhicharan Highway Road. The total length of the proposed transmission line is 11.1 km. The TL passes through 0.3 ha of community forest area, 1.8 ha of agricultural land, 2.7 ha nearby settlement area and barren land, 1.3 ha of river area and sandy area and 0.4 ha of grassland. The affected forest land within the RoW of the TL alignment is managed by community/government forest. The nearest settlement along the TL

project are Katari Bajar, Debidhap, Rajabas, Taraghari, Amtari, Thami Tole, Dami Tole, Simle Tole, Pokhare, Namuna Tole, Danda Tole, Khorbhanjyang, Shankharatar, Titakani, Aaap Danda, Dokan Danda, Lakhima, Gayalfhora, Dabrekuna etc.

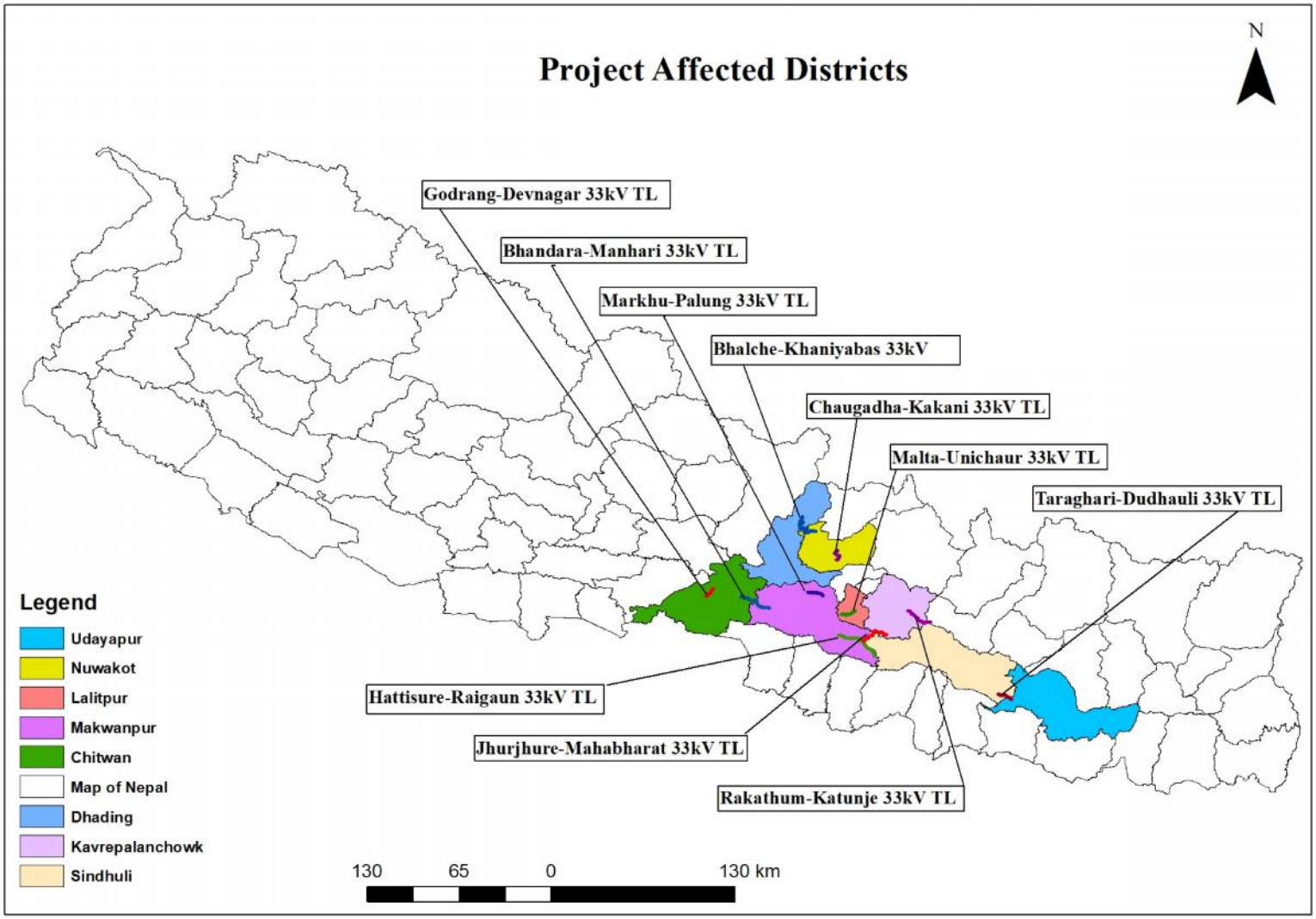


Figure 1: Project Location Map

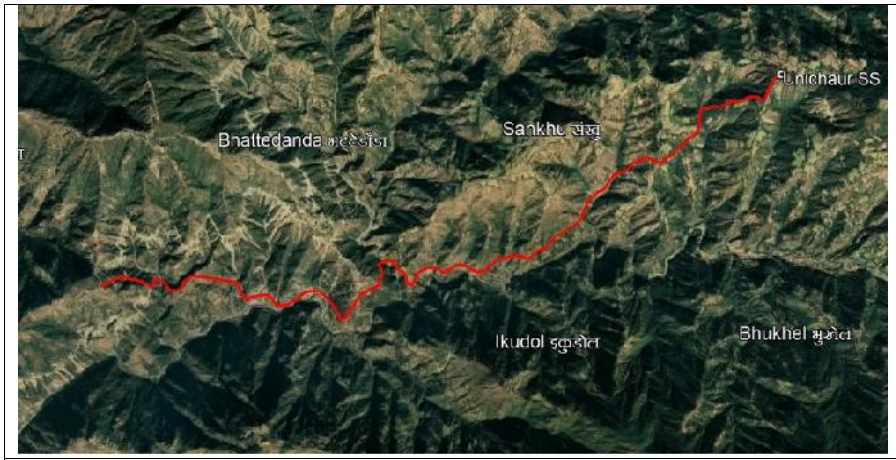
2.2 Transmission Line

Godrang-Devnagar TL

Bhandara-Manahari TL

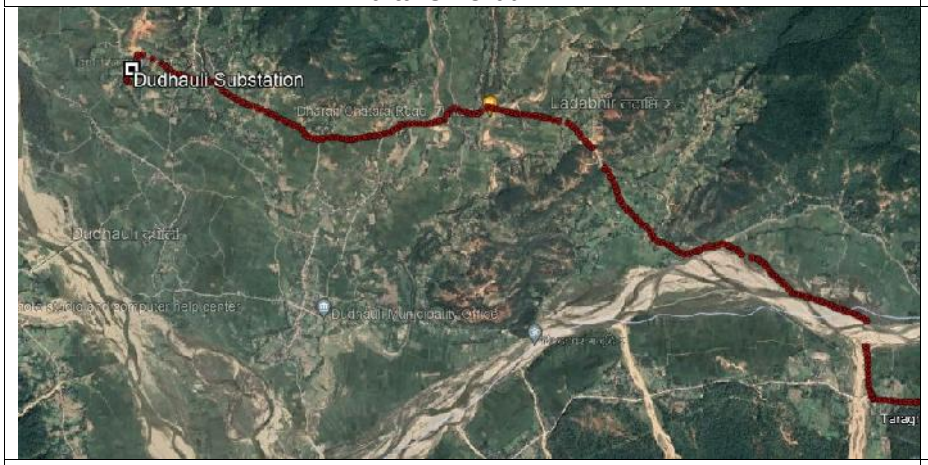
Markhu-Palung TL

Hattisure-Raigaun TL

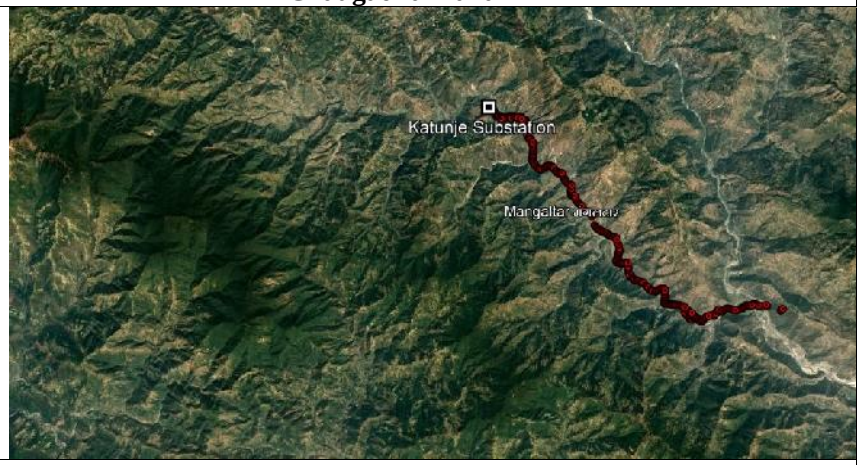


Malta-Unichaur TL

Chaugadha-Kakani TL



Taraghari-Dudhauli TL



Rakathum-Katunje TL

Bhalche-Khaniyabas TL

Jhurjhure-MahabharatTL

Figure 2: Project Location Map

2.3 Project Features

Table 2: Project site features

S.N.	Project site	Length (km)	No. of poles	Pole area (ha)	RoW (ha)
1.	Godrang-Devnagar TL	9.3	178	0.0036	5.58
2.	Bhandara-Manahari TL	24	473	0.0096	14.39
3.	Markhu-Palung TL	12.4	268	0.0054	7.43
4.	Hattisure-Raigaun TL	32.5	682	0.0138	19.49
5.	Chaughada-Kakani TL	12.22	371	0.0075	7.32
6.	Malta-Unichaur TL	11.6	228	0.0046	6.96
7.	Rakathum-Katunje TL	21.7	402	0.0081	13.01
8.	Jhurjhure-Mahabharat TL	22.5	317	0.0064	13.49
9.	Bhalche-Khaniyabas TL	38.3	658	0.0133	22.97
10.	Taraghari-Dudhauli TL	11.1	209	0.0042	6.66
Total		**195.62**	**3786**	**0.076**	**117.29**

Source: Field Survey

2.4 Construction Planning

The implementation of the proposed project comprises the construction of the new ten 33 KV transmission line. The subproject districts areChitwan, Makwanpur, Lalitpur, Nuwakot, Kavrepalanchowk, Dhading, Udayapur, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha District. The line stringing work is estimated to complete before the contract expires which is on 31st Dec, 2022, but the completion time depends on project site condition like geography and public support.

2.4.1 Preliminary Works

Preliminary works for the proposed 33/11 kV TL projects consist of carrying the detailed design and engineering study. The detailed design and engineering study will carry out the longitudinal profiles, geological field test and laboratory testing, topographic study, etc., contract award, and mobilization of the contractor.

2.4.2 Land

The project requires a total of 117.37 ha of land which consists mainly the ROW land and a very small amount of land (0.076 ha) for pole foundation for all 10 new 33kV TL. These lands will not be acquired by the the project permanently except the pole erection holes in private land which will be obtained through people's consent.The private agricultural lands will be affected due to the construction works of the subproject. In case of private lands

affected by pole installation as well as RoW (6 meter or 3 meter either side from the centre) for 33 kV lines, the process for using the lands involves prior consultation and obtaining consent of all land affected families along with the documentation of these information. Affected people will not be paid any compensation for these lands and will continue to cultivate their lands as usual after the completion of the works. As 33 and 11 kV lines are meant for local electrification, the communities are proactively ready to extend their supports and cooperation for completing the works.

Altogether, a total of 3786 poles are required for 10 new 33kV TL. The land required for pole foundation is 0.45 m x 0.45 m which is very minimal and the land owners have agrred to provide their consent for erecting the poles but this has to be done with their participation so that the erected poles do not cause any damage to their parcels.To the extent possible, the TL will be routed in such manner that it avoids private land during the construction phase.The land required and number of poles for 10 new 33kV TL are presented in the table below.

Table 3: Land required by the project for RoW

S.N.	Project site	Length (km)	Landuse		
			Agricultural Land (ha)	Forest (ha)	Others (ha)
1.	Godrang-Devnagar TL	9.3	1.4	0.94	3.13
2.	Bhandara-Manahari TL	24	1.4	0.9	11.8
3.	Markhu-Palung TL	12.4	1.79	0.75	4.76
4.	Hattisure-Raigaun TL	32.5	0.75	0.56	18.04
5.	Chaughada-Kakani TL	12.22	3.2	3.3	0.73
6.	Malta-Unichaur TL	11.6	0.32	5.2	1.33
7.	Rakathum-Katunje TL	21.7	5.1	1.2	6.5
8.	Jhurjhure-Mahabharat TL	22.5	3.1	1.5	7.45
9.	Bhalche-Khaniyabas TL	38.3	1.6	13.73	7.45
10.	Taraghari-Dudhauli TL	11.1	1.8	0.3	4.4
Total		**195.62**	**20.46**	**28.38**	**65.59**

Note: Others (Grassland, Barrenland, Sand and water body)

Table4: Number of poles required for the project

S.N.	Project site	No. of poles			
		Agricultural Land	Forest	Others	Total
1.	Godrang-Devnagar TL	27	-	151	178
2.	Bhandara-Manahari TL	103	28	342	473
3.	Markhu-Palung TL	64	40	164	268
4.	Hattisure-Raigaun TL	106	89	487	682
5.	Chaughada-Kakani TL	94	132	145	371
6.	Malta-Unichaur TL	36	106	86	228
7.	Rakathum-Katunje TL	189	139	74	402
8.	Jhurjhure-Mahabharat TL	86	104	127	317
9.	Bhalche-Khaniyabas TL	168	337	153	658
10.	Taraghari-Dudhauli TL	44	7	158	209

Total	**917**	**982**	**1887**	**3786**

Note: Others (Grassland, Barrenland, Sand and water body)

2.4.3 Requirement of workforce

During the construction stage of the transmission line project, approximately 70-80 people will be employed in each site for the construction activities in all 10 sites and transportation of material including 5 skilled (Engineers and Overseer), 30-35 Semi-skilled and 25-30 unskilled(Labor). The workforce will be used for the entire construction period by will vary depending upon the length of subprojects,land terrain and public support. The labors will be hired by the contractor.

2.4.4 Materials used for the construction of a TL

Different materialswill be used for the construction of the project. From the review of a similar 33kV/11 kV TL project, the materials used during the construction work are as follows

a. Steel Tubular Poles
b. ACSR "Dog" Conductor
c. DISC and PIN Insulator with hardware
d. Pole accessories
e. Stay sets
f. Cement, bricks, and aggregate
g. Other essential material as per the requirement

The construction materials will be arranged by the contractor on a turnkey basis before construction. Other materials like cement, aggregates, and sand for the TL pole foundation construction will arranged as per the requirement by the contractor, and construction safety equipment will be provided by the contractor as applicable as per site condition.

2.4.5 Camps and storage areas

Land required for the labor camps and storage of construction materials will be rented in the convenient sites of the TL route.. The area designated for the camps will also damage the leased or rented area. Both temporary mobile camps and storage sites will be located in the same place. The impact will be low in magnitude, site-specific, and for a short duration.

2.4.6 Spoil management

The foundation excavation for the TL pole will generate ahuge spoil and will be calculated later. Spoil generated from the pole erection will be managed by using in pole foundation

covering area and the remaining spoilwill be managed in the prescribed area selected by the project.

2.4.7 Project Duration

The total duration for construction of the TL project will take a minimum of 1-year from the date of contract award.

3 Existing Environmental and Social Setting

The project includes ten 33/11kV TLalignment in ten districts i.e.Godrang-Devnagar 33kV TL in Chitwan district, Bhandara-Manahari 33kV TL in Makwanpur and Chitwan district, Markhu-Palung 33kV TL and Hattisure-Raigaun 33kV TL in Makwanpur district, Rakathum-Katunje33kV TL in Ramechhap, Sindhuli and Kavrepalanchowk district, Jhurjhure-Mahabharat 33kV TLin Makwanpur and Kavrepalanchowk district, Chaugadha-Kakani 33kV TL in Nuwakot district, Malta-Unichaur 33kV TL in Lalitpur district, Bhalche-Khaniyabas 33kV TL in Nuwakot and Dhading district,Taraghari-Dudhauli33kV TL in Udayapur and Sindhuli district. For the purpose of this ESMP, the study area is defined to be the area affected by transmission line alignment. The settlement areas, and agricultural area, forest, and other vegetation, built-up infrastructure, and facilities of TL were under the scope of the study. The RoW of 33kV TL is 4m (2m in each side from central line) as defined by the Electricity Regulation,2051BS but in practice 6m is considered as the RoW land. Any built-up structure, settlement area, forest area that falls under this area is defined as a highly impacted area.

The proposed project sites vary in terms of elevation, topographic factor, climate, geology forest type, social composition in different districts. The environmental and social impact of the project also varies depending upon the environmental and socio-economic setting. The ESMP reflects the environmental and social baseline information based on the field study, literature review, CBS profile, District profile, Municipality and Rural Municipality Profile, and other published sources.

3.1 Environmental Baseline

3.1.1 Physical Environment

The proposed ten 33/11kV TL project lies in the different topographical, climatic,and geological setting of Nepal. The topography, landuse, climatic condition, geomorphology and geology, air and noise condition, watershed, and drainage pattern that shall be influenced due to the construction of the project has been discussed in the physical environment. The details of the physical environment of ten sub-project area are given in the table below:

PhysicalEnvironment

Table 5 : Details of biological environment of the sub-project area

S.N.	Project Component	Description
1.	Godrang-Devnagar TL	• The altitudinal variation of the proposed TL is between 190 to 215 msl; • Sub-tropical climatic zone, the climate here is mild, and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Chitwan district are 36.7^{o}C and 17.7^{o}C respectively; the average annual precipitation of the Chitwan district is 2150mm. • Located in terai zone which consists of rocks such sandstone, conglomerates, quartzite, shale and micaceous etc. The project consists of alluvial soil; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural part of metropolitan. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The slope of area is flat plain; so chances of water logging is possible. • Land restricted for TL project for pole and RoW is 5.58 ha which includes agricultural, grassland and barren land. • The proposed project have no possibility of landslide and erosion or land instability
2.	Bhandari-Manahari TL	• The elevation range of Chitwan is 150 to 750 msl and Makwanpur is 166 m to 2.584 msl; • The elevation range of proposed project is 215 to 433; • Sub-tropical climatic zone, the climate here is mild, and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Chitwan district are 36.7^{o}C and 17.7^{o}C and Makwanpur respectively 37°C and 26°C. The average annual precipitation of the Makwanpur district is 2000mm. • Located in terai zone which consists of rocks such sandstone, conglomerates, quartzite, shale and micaceous etc. The project consists of alluvial soil; • The sub-project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural area. The TL project area is not industrialized, so the only source of air pollution is from dust, smoke generated by vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air. • The main source of noise pollution in the project area is the vehicular movement along the highway and local road. Others source of noise in the area relates to the anthropogenic activities of rural population such as talking playing radio television, barking of dogs, calls of bird and animals and whispering of winds. In general, the noise level in the area is near to the natural state. • The project site is located in terai and foothill of siwalik and Mahabharat range which gentle slope rivers running through the district, the main ones being the

S.N.	Project Component	Description
		Rapti, Bagmati, Bakaiya, Manahari and Lothar; in addition, there are many smaller streams, which could be the factor of flooding in Manahari RM, whereas the as the field survey project alignment have no risk of flooding and erosion. • Land acquired by the proposed project is 14.39 ha. Most of the poles fell in the grassland, barren and other type of land;
3.	Hattisure-Raigaun TL	• The elevation of proposed TL project is 186 msl to 475 msl; • Sub-tropical and Temperate climate, dry winter, hot summer. Monsson influenced by humid subtropical climate. Average annual maximum and minimum temperature prevail in Makwanpur district are 26.7^{o}C and 15.1^{o}C in respectively; Average annual precipitation is 1961.4mm • Located in Valleys within the Churia Hills filled up by coarse to fine alluvial sediments. • The TL project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the Hetauda - pafarbhari road. The overall status of air and noise quality found to be within the acceptable limit; • Land acquired by TL project is about 19.49 ha. The most of the land acquired by project is barren, grassland and other type of landuse;
4.	Markhu-Palung TL	• The elevation of proposed TL project is 1515 msl to 1814 msl; • Sub-tropical and Temperate climate, dry winter, hot summer. Monsson influenced by humid subtropical climate. Average annual maximum and minimum temperature prevail in Makwanpur district are 26.7^{o}C and 15.1^{o}C in respectively; Average annual precipitation is 1961.4mm • Located Mahabharat range which consist Schist, phyllite, gneiss, quartzite, granite and limestone belonging to the Lesser Himalayan. • The TL project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the Tribhuvan highway and local earthen raod. The overall status of air and noise quality found to be within the acceptable limit; • Land acquired by TL project is about 7.43 ha. The most of the land acquired by project is agricultural, barren, grassland and other type of landuse;
5.	Malta-Unichaur TL	• The elevation of proposed TL Project is 923msl to 1985msl; • Climate is characterized by relatively high temperatures and evenly distributed precipitation throughout the year. The Köppen Climate Classification subtype for this climate is "Cfa" (Humid Subtropical Climate). Annual average maximum and minimum temperature prevail in lalitpur district are 18.8^{o}C and 8.2^{o}C respectively; • Located in mid hill region, geology consist; Schist, phyllite, gneiss, quartzite, granite, limestone geologically belonging to the Lesser Himalayan; • The sub-project area is apparently clean in terms of pollution level on air and noise as the sub-project site lies in non-industrial area, so the main source of air and noise pollution is due to vehicular movement along the Kanti Lokpath. The overall status of air and noise quality found to be within the acceptable

S.N.	Project Component	Description
		limit; • Land acquired by TL project for RoW and Pole is about 6.96 ha. The most of the land acquired by project is agricultural, barren, grassland and other type of landuse;
6.	Chaughada Kakani TL	• The elevation of proposed TL project is 545msl to 1600 msl; • Climate is characterized by subtropical, temperate however some region of Nuwakot district lies in sub alpine to alpine zone. The Köppen Climate Classification subtype for this climate is "Cwa" (Monsoon-influenced humid subtropical climate). Annual average maximum and minimum temperature prevail in Nuwakot district are 23.6 ^{o}C and 12.4^{o}C respectively; • Located in midland and fore Himalayan region, geology of the district consists; Schist, phyllite, gneiss, quartzite, granite, limestone geologically belonging to the Lesser Himalayan and Gneisses, schists, phyllite and marbles mostly belonging to the northern edge of the Lesser Himalayan Zone; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural area. So the only source of air pollution is from dust, smoke generated by vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The main source of noise pollution in the TL project area is the vehicular movement along the earthen road. Others source of noise in the area relates to the anthropogenic activities of rural population. In general, the noise level in the area is near to the natural state; • Land acquired by proposed TL project for RoW and Pole is 7.32 ha. Most of the poles fells under the agricultural land followed by community forest land.
7.	Rakathum - Katunje TL	• The elevation of the proposed TL is 565 msl to 971msl; • Upper tropical climatic zone, the climate here is mild and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Kavrepalanchowk district are 23.1^{o}C and 11.9^{o}C respectively; the average annual precipitation of the Kavrepalanchowk district is 1311.3 mm. • Located in mid hill zone which consists of rocks such as phyllite, quartzite, slate, etc. The project consists of alluvial deposition and genle rocky slope; • The project area is clean in terms of pollution level on air and noise as the sub-project lies in rural part of the rural municipality. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; sub-project location has terrace land; so, there is no chances of waterlogging. • Land acquired by proposed TL project for RoW and Pole is 13.01 ha. Most of the poles lies under the agricultural land followed by forest land.
8.	Bhalche-Jharlang TL	• The elevation of the proposed TL project is 886 msl to 2334 msl; • Sub-tropical climate zone, the climate here is mild and generally cold and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in

S.N.	Project Component	Description
		Dhading district are 28.58°C and 12.25°C. The average annual precipitation of the Dhading district is 2121.2 mm. • Located in hill zone which consists of rocks such as Gneiss, migmatite etc. The project consists of alluvial soil; • The sub-project area is clean in terms of pollution level on air and noise as the sub-project lies in a rural area. The project area is not industrialized, so the only source of air pollution is from dust, smoke generated by vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air. • The main source of noise pollution in the project area is the vehicular movement along the local road. Others source of noise in the area relates to the anthropogenic activities of the rural population such as talking playing radio television, barking of dogs, calls of bird and animals and whispering of winds. In general, the noise level in the area is near to the natural state. • The project site is located in hill with gentle slope and terrace land, the sub project has no risk of flooding. • Land acquired by proposed TL project for RoW and Pole is 7.32 ha. Most of the poles lies under the agricultural land followed by forest land.
9.	Jhurjhure-Mahabharat TL	• The elevation of the proposed TL project is 237 msl to 990 msl; • Upper tropicalclimate zone, dry winter, hot summer. Absolute extreme maximum and minimum temperature prevail in Kavrepalanchowk district are 23.1°C and 11.9°C respectively; the average annual precipitation of the Kavrepalanchowk district is 1311.3 mm.Monsson influenced by humid subtropical climate. Average annual maximum and minimum temperature prevail in Makwanpur district are 26.7°C and 15.1°C in respectively; Average annual precipitation is 1961.4mm • Located in hilly region with rugged terrain and alluvial sediments. • The project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the local road. The overall status of air and noise quality found to be within the acceptable limit; • Land acquired by proposed TL project for RoW and Pole is 13.49 ha. Most of the poles lies under the agricultural land followed by community forest land.
10.	Taraghari-Dudhauli TL	• The elevation of the proposed TL project is 185 msl to 190 msl; • Lower tropical climate region, dry winter, hot summer. The average annual maximum and minimum temperature prevail in Sindhuli district are 27.2°C and 15.8°C respectively; Average annual precipitation is 1698.8 mm. • Located in Terai range which consists of sandstone, fluvial, calcareous soil. • The project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the local earthen road. The overall status of air and noise quality found to be within the acceptable limit; • Land restricted for TL project for pole and RoW is 6.66 ha which includes agricultural, grassland and barren land.

Source: Field Survey

3.1.2 Biological Environment

Vegetation and forest resources, mammals and birds, and rare and protected species of flora and fauna found in the subproject area are studied in a biological environment. The proposed projects mainly lie in the Upper tropical, Tropical, Sub-tropical, Lower tropical and temperate climatic region, which influence the presence of vegetation and wild animals.The summary of the biological environment of the project area is given below:

Table6 : Details of biological environment of the sub-project area.

S.N.	Project Component	Description
1.	Godrang-Devnagar TL	• 6km of the TL passes through Chitwan National Park buffer zone. • 30 of tree species were found along the TL RoW (Route alignment) • 28 mammal's species were found in the project affected area • 17 type of Avifauna were found in the project affected area • 8 types of reptiles were found in the project affected ward • Total 303.3 m^3 of biomass will loss from the project • Daschinkali CF, Bhagbhairav CF, affect from the TL
2.	Bhandari-Manahari TL	• 10 km of the TL passes alongside Parsa National Park Boundary. • 28 of tree species were found along the TL RoW (Route alignment) • 16 mammal's species were found in the project affected area • 17 type of Avifauna were found in the project affected area • 8 types of reptiles were found in the project affected ward • Total 282.91 m^3 of biomass will loss from the project • Simpani Devkot CF, Sunachuri CF, and Ghattebagar LFaffect from the TL
3.	Hattisure-Raigaun TL	• No any protected areas lie in proposed TL vicinity • 29 type of tree species were found along the TL RoW (Route alignment) • 10 type of mammal's species were found in the project affected area • 9 type of Avifauna were found in the project affected area • 11 types of reptiles were found in the project affected ward Table 5: Summary of Biological Environment • Total 290.01m^3 of biomass will loss from the project • Hatti CF, Trebeni CF, Bhaiseshwor CF, Bankalli CF, Lailiguras CF, Akash CF, Rudrakali CF, Badghari CF and sunkhosi Cf are affected from the TL project
4.	Markhu-Palung TL	• No any protected areas lie in proposed TL vicinity • 14 of tree species were found along the TL RoW (Route alignment) • 9 mammal's species were found in the project affected area • 10 type of Avifauna were found in the project affected area • 8 types of reptiles were found in the project affected ward • Total 63.74 m^3 of biomass will loss from the project • Kalidevi CF is affected from the TL project
5.	Malta-Unichaur TL	• No any protected areas lie in proposed TL vicinity • 35 of tree species were found along the TL RoW (Route alignment) • 10 type of Avifauna were found in the project affected area

S.N.	Project Component	Description
		• 6 types of reptiles were found in the project affected ward • Total 76.25m^3 of biomass will loss from the project • Yaspa CF, Bhagbhairav CF, Khanidanda CF are affected from the TL
6.	Chaughada Kakani TL	• No any protected areas lie in proposed TL vicinity • 9 type of tree species were found along the TL RoW (Route alignment) • 6 type of mammal's species were found in the project affected area • 10 type of Avifauna were found in the project affected area • 5 types of reptiles were found in the project affected ward • Total 44.43m^3 of biomass will loss from the project • Chaughada-kali CF, Trishuli -pakha CF and Mangal Devi CF lies along TL
7.	Rakathum - Katunje TL	• No any protected areas lie in proposed TL vicinity • 18 tree species were found along the TL RoW (Route alignment) • 7 type of mammal's species were found in the project affected area • 9 type of Avifauna were found in the project affected area • 8 types of reptiles were found in the project affected ward • Total 82.4 m^3 of biomass will loss from the project • Tinpiple CF and Narayanthan CF lies along the TL
8.	Bhalche-Jharlang TL	• No any protected areas lie in proposed TL vicinity • 18 tree species were found along the TL RoW (Route alignment) • 10 type of mammal's species were found in the project affected area • 10 type of Avifauna were found in the project affected area • 6 types of reptiles were found in the project affected ward • Total 134.13 m^3 of biomass will loss from the project • Hope CF, Pachet CF and Thulogau CF are affected by the TL project
9.	Jhurjhure-Mahabharat TL	• No any protected areas lie in proposed TL vicinity • 17 tree species were found along the TL RoW (Route alignment) • 9 type of mammal's species were found in the project affected area • 9 type of Avifauna were found in the project affected area • 6 types of reptiles were found in the project affected ward • Total 28.26 m^3 of biomass will loss from the project • Durbardhara CF, Jagir CF are affected by the TL project
10.	Taraghari-Dudhauli TL	• No any protected areas lie in proposed TL vicinity • 12 tree species were found along the TL RoW (Route alignment) • 7 type of mammal's species were found in the project affected area • 11 type of Avifauna were found in the project affected area • 5 types of reptiles were found in the project affected ward • Total 13.53 m^3 of biomass will loss from the project • Sadabahar CF, Pokhare CF are affected by the TL project

Source: Field Survey

Table 7: Details of the major CFs, Major Tree Species, Mammals, Bird Species

S.N.	Project site	Community Forest along TL	Major Tree species	Wildlife	Bird Species
1.	Godrang-Devnagar TL	Daschinkali CF Bhagbhairav CF	Sal (*Shorea robusta*), Pipal (*Ficus religiosa*), Bar (*Ficus Bengalensis)*, Sami (*Ficus benjamina*), Bakaina*(Melia azedarach)*, Teak (*Tectona grandis*), Bhalayo *(Semecarpus anacardium)*,Dabdabe (*Garuga piñata*),Sisso (*Dalbergia sissoo*), Badhar (*Artocarpus lakoocha*),	Pangolin (*Minus pentadocyla*), Terai Gray Langur (*Semnopithcushector*), Monkey (*Macaca fascicularis*), Rabbit (*Oryctolagus cuniculus*), Bat(*Chiroptera*), Dumsi(*Porcupine*), Squirrel(*Funambulus pennantii*), Deer(*Odocoileus virginianus*), Fox (*Vulpes vulpes*), Leopard (*Panthera pardus*), Jackel (*Canis aureus*), Ghoral (*Neumorhedus ghoral*), Mongoose (*Herpestidae*), Jungle Cat (*Felis chaus*), Bengal Tiger (*Panthera tigris tigris*), Asiatic Elephant (*Elephus maximum*)	Peacock (*Pavo cristatus*), Sparrow (*Passeridae spp*), Dhukur (*Stretopelia orientalis*), Owl (*Strigiformes spp*) Jureli (*Hypsipetes leucocephalus*), Dhanesh (*Buceros bicornis*), Parrot (*Psittaciformexi spp*), Maina (*Acridotheres tristis*), Eagle (*Haliacetus leucocephalus)*
2.	Bhandara-Manahari TL	Simpani Devkot CF, Sunachuri CF, Ghattebagar LF	Bel (*Aegke marmelos)*, Sal *(Shorea robusta)*, Ashoka*(Saraca asoca)*, Badahar*(Artocarpus lakoocha)*, Khair *(Senegalia catechu)*, Sisso *(Dalbergia sissoo)*, Masala *(Eucalyptus camaldulensis)* Padke *(Albizia julibrisin)*, Seto siris *(Ablizia procera)*, Koirala *(Bauhinia variegate)*, Mango*(Mangifera indica)*, Jamun*(Syzgium cumini)*, Khaniyo/Khanyu*(Ficus semicordata)*	Spotted deer *(Axis axis)*, Nilgai *(Boselaphus tragocamelus)*, Ghoral *(Naemorhedus)*, Wild boar *(Sus scrofa)*, Asiatic elephant *(Elephas marimus)*, Bat *(Rhinolophus spp)*, Jungle cat *(Felis chas)*, Mangoose *(Herpestidae spp)*, Dunsi *(Porcupine)*, Grey langur *(Semnopithccus hector)*, Red fox *(Vulpes vulpes)*,n Rhesus macaque *(Macaca mulatta)*	Bhadrai *(Haliaeetus leucocephalus)*, Peacock*(pevo cristutus)* Nyahuli Chari *(Megala vivens)*, Sarus crane *(cyrus Antigone)*, Eagle *(Haliaeetus leucocephalus)*, Dhukur *(Streptopelia orientalis)*, Koile *(Eudynamys scolopaceus)*, Maina *(Acridotheres tristis)*, Dhanesh *(Buceros bicornis)*, Parrot *(Psittaciformes spp)* Jureli *(Hypsipetes leucucephalus)*
3.	Markhu-Palung TL	Kalidevi CF	Uttis *(Alnus nepalensis)*Salla/ Gobre salla *(Pinus wallichiana)*Paiyu *(Prunus cerasoides)*Dudhilo *(Ficus nerifolia)* Kaulo *(Machilus odoratissima)*Rani salla *(Pinus roxburgii)*Tuni *(Toona ciliate)* Lapsi *(Choerospondias axillaris)*Laligurans *(Rhododedron arboretum)*	Chituwa *(Panthera pardus)*Ban biralo(*Felis chaus*)Kharayo *(Lepus nigricollis*)Lokharke *(Funambulus spp*)Malsapro *(Martes flavigula*) DunshiChamero(*Pteropus giganteus)* Monkey(*Macaca mulatta*)	Sparrow *(Passeridae spp)*Parrot *(Psittaciformes Spp)*Nyahuli *(Megala Vivens)*Spiny Babler *(Turdoided nipalensis)*,Green Pigeon *(Treron Sphenurus), S*erpant Eagle *(Spilornis Cheela)*, Dhukur *(Streptopelia orientalis)*, Koile *(Eudynamys scolopaceus)*, Maina *(Acridotheres*

S.N.	Project site	Community Forest along TL	Major Tree species	Wildlife	Bird Species
			Kafal *(Myrica esculenta)*Kalkiful *(Callistemon citrinus*		*tristis)* Dhanesh *(Buceros Bicornis*
4.	Hattisure-Raigaun TL	Hatti CF, Trebeni CF, Bhaiseshwor CF, Bankalli CF, Lailiguras CF, Akash CF, Rudrakali CF, Badghari CF and sunkhosi Cf	Bel *(Aegke marmelos*), Ashoka *(Saraca asoca)*, Badahar *(Artocarpus lakoocha*), Bakaino *(Melia azadirach)*,Bar *(Ficus benghalensis*), Chilauney *(Schima wallichi)*,Chiuri *(Bassia butyracea*), Ipil ipil *(Ipil ipil)*,Jamun *(Syzgium cumini*), Katahar (*Artocarpus heterophyllus)*Kavro/Kauro *(Ficus lacor*), Khaniyo/Khanyu (*Ficus semicordata)*,Kimbu (*Morus alba*), Koirala *(Bauhinia variegate)*, Kutmero (*Litsea monopetala*), Mango *(Mangifera indica)*,	Chituwa *(Panthera pardus)*, Syal *(Canis Aureus)*, Ban Biralo *(Felis Chaus)*, Kharayo (*Lepus nigricolis*), Red Fox (Vulpes *Vulpes*), Rhesus Macaque (*Macaca Mulata*), Dunshi (*Hystrix Vulpes*), Chamero (*Pteropus giganteus*), Spotted Deer (*Axis axis*), Ghoral (*Naemorhedus goral*)	Bhadrai *(Haliaeetus leucocephalus)*, Peacock *(pevo cristutus)* Nyahuli Chari *(Megala vivens)*, Sarus crane *(cyrus Antigone)*, Eagle *(Haliaeetus leucocephalus)*, Dhukur *(Streptopelia orientalis)*, Koile *(Eudynamys scolopaceus)*, Maina *(Acridotheres tristis)*, Dhanesh *(Buceros bicornis*)
5.	Chaughada-Kakani TL	Chaughada-kali CF, Trishuli - pakha CF and Mangal Devi CF	Sal *Shorea robusta* Salla *Pinus roxburghii* Chilaune *Schima wallichhi* Utis *Alnus nepalensis* Khaniu *Ficus semicordata* Kumbi *Eichhornia crassipe* Simal *Bombax cibea*	Barking Deer *Muntiacus muntjak* Rhesus Macaque *Macaca mulatta* Bengal Fox *Vulpes bengalensis*Clouded Leopard *Neofelis nebulosa* Chinese Pangolin *Manis pentadactyla*Yellow throated Marten *Martes flavigula*	Crow *Corvus levaillantii*, Sparrow *Passer domesticus*, Rose-ringed Parakeet *Psittacula krameri*, Pheasant *Lophura leucomelanos*,Dove *Streptopelia tranquebarica* Common Myna *Acrido therestristis*, Red Jungle owl *Gallus Gallus*, Warbler *Acrocephalus dumetorum*, Owl *Athene brama*
6.	Malta-Unichaur TL	Yaspa CF, Bhagbhairav CF, Khanidanda CF	Utis, Chilaune, Kaulo, Katus, Jamuna, Saur, Payeu, Sal, Magnifera indica	Assamese Monkey, Barking Deer, Leopard, Porcupine, Jungle Cat, Jackal, Rabbit, Spotted Deer	Maina Barn owl Patridge Pigeon Eagle Dove Weaver Kalij Hornbill Wood duck
7.	Rakathum-Katunje TL	Tinpiple CF Narayanthan CF	Khair (*Acacia catechu*), Sissoo (*Dalbergia sissoo*), Simal (*Bombax cieba*), Mango (*Magnifer indica*), Sallo (*Pinus roxburghii*), Phadim , Katahar (*Rocarpus heterophyll*), Agrakh (*Shoera robusta*), Khirra (*Falconderia insignis*),	Chituwa (Panthera pardus), Syal (Canis Aureus), Ban Biralo (Felis Chaus), Dumshi (Hystrix Vulpes), Chamero (Pteropus giganteus) Squirrels (Funambulus spp), Monkey (Macaca mulatta),	Sparrow (*Passeridae spp*) Parrot (*Psittaciformes Spp*) Nyahuli (*Megala Vivens*) Green Pigeon (*Treron Sphenurus*), Serpant Eagle (*Spilornis Cheela*), Dhukur (*Streptopelia orientalis*), Koile (*Eudynamys*

S.N.	Project site	Community Forest along TL	Major Tree species	Wildlife	Bird Species
			Tilke, Amba (*Psidiun guajava*), Jamuna (*Syzigium cumini*), Pipal (*Ficus religiosa*), Dabdabe (*Garuga Pinnata*), Utis (*Alnusnepalensis*), Bel (*Aegele marmelos*), Amala (*Emblica officinalis*), Khanyu (*Ficussemicordata*)		*scolopaceus*), Maina (*Acridotheres tristis*) Dhanesh (*Buceros Bicornis)*
8.	Jhurjhure-Mahabharat TL	Durbardhara CF, Jagir CF	Khair *Acacia cathechu,* Seto Siris *Albizia procera,* Kataha*rArtocarpus heterophyllus,* Koiralo *Bahunia verigata,* Botdhayero *Lagerstroemia parviflora,* Asna *Termanelia tomentosa,* Sal *Shorea robusta* Khirro *Wrightia arborea,* Chilaune *Schima wallichii,*	Chituwa (*Panthera pardus*), Syal (*Canis Aureus*), Ban Biralo (*Felis Chaus*), Dumshi (*Hystrix Vulpes*), Chamero (*Pteropus giganteus*) Squirrels (*Funambulus spp*), Rhesus Monkey (*Macaca mulatta*), Bat (*Chiroptera*), Wild Boars (*Sus scrofa*)	Sparrow (*Passeridae spp*) Parrot (*Psittaciformes Spp*) Dove (*Streptopelia orientalis*), Koile (*Eudynamys scolopaceus*), Maina (*Acridotheres tristis*), Red Vented Bulbul(*Pycnonotus cafer*), Himalayan Bulbul (*Pycnonotus leucogenys*), Blue Whistling thrush (*Myophonus caeruleus*), Red-billed blue magpie (*Urocissa erythroryncha*)
9.	Bhalche-Khaniyabas TL	Hope CF, Pachet CF and Thulogau CF	Utis (*Alnusnepalensis*), Chilaune (*Schima wallichii*), Sal (*Shorea robusta*), Painyu (*Prunus cerasoides*), Malato, Laliguras *(Rhododendron arboretum)*, Rakchan (*Daphniphyllum himalense)*, Tanki, Salla (*Pinus wallichiana)*	Chituwa (*Panthera pardus*), Syal (*Canis Aureus*), Ban Biralo (*Felis Chaus*), Dumshi (*Hystrix Vulpes*), Chamero (*Pteropus giganteus*) Squirrels (*Funambulus spp*), Rhesus Monkey (*Macaca mulatta*), Yellow throated Marten (*Martes flavigula*), Bengal Fox (*Vulpes bengalensis*), Clouded Leopard (*Neofelis nebulosa*)	Sparrow (*Passeridae spp*) Parrot (*Psittaciformes Spp*) Green Pigeon (*Treron Sphenurus*), Dove (*Streptopelia orientalis*), Koile (*Eudynamys scolopaceus*), Maina (*Acridotheres tristis*), Shikra (*Accipiter badius*), Phesant (*Lophura leucomelanos*)
10.	Taraghari-Dudhauli TL	Sadabahar CF, Pokhare CF	Badahar *Artocarpus lakoocha,* Dabdabe *Garuga pinnata* Ipil Ipil *Leucaena leucocephala,* Jamun *Syzgium cumini,* Katahar *Artocarpus heterophyllus,* Khanyu *Ficus semicordata,* Kimbu *Morus alba* Mango *Magnifera indica* Moringa *Moringa oleifera* Sal *Shorea robusta* Simal *Bombax ceiba* Sissoo *Dalbergia sissoo*	Syal (*Canis Aureus*), Ban Biralo (*Felis Chaus*), Dumshi (*Hystrix Vulpes* Squirrels (*Funambulus spp*), Rhesus Monkey (*Macaca mulatta*), Bengal Fox (*Vulpes bengalensis*, Bat (*Chiroptera*)	Sparrow (*Passeridae spp*) Spotted Dove (*Spilopelia chinensis*), Red Vented Bulbul(*Pycnonotus cafer*), Common Myna (*Acridotheres tristis*) , Jungle Myna (*Acridotheres fuscus)*, Oriental Magpie Robin (*Copsychus saularis)*, Golden oriole (*Oriolus oriolus*),

3.1.3 Socio-Economic and Cultural Environment

The subproject sites of proposed 33/11 kV TL alignment affects one metropolitan city, five municipalities and eighteen rural municipalities of ten districts of Nepal. The total area of the project affected wards is 1957.77 sq.km. According to CBS 2011, the total population of project affected wards is 2,39,163 with 1,13,545male and 1,25,331 female. There are diverse ethnic caste groups residing in the subproject affected wards along with indigenous caste groups: Gurung, Newar, Magar. The details are given in table 9 below.

Table 8: Details of the location of the proposed 33kV TL

S.N.	Project site	District	Municipality/Rural Municipality
1.	Godrang-Devnagar TL	Chitwan	Bharatpur Metropolitan City
2.	Bhandara-Manahari TL	Chitwan, Makwanpur	Rapti M and Manhari RM
3.	Markhu-Palung TL	Makwanpur	Indrasarowar RM and Thaha M
4.	Hattisure-Raigaun TL	Makwanpur	Bakaiya RM and Bagmati RM
5.	Chaughada-Kakani TL	Nuwakot	Likhu RM and Kakani RM
6.	Malta-Unichaur TL	Lalitpur	Bagmati RM and Konjyosom RM
7.	Rakathum-Katunje TL	Ramechhap, Sindhuli, Kavrepalanchowk	Khadadevi RM, Sunkoshi RM, Temal RM, Roshi RM, Namobuddha M
8.	Jhurjhure-Mahabharat TL	Makwanpur, Kavrepalanchowk	Bagmati RM, Khanikhola RM and Mahabharat RM
9.	Bhalche-Khaniyabas TL	Nuwakot, Dhading	Kispang RM, Meghang RM and Khaniyabas RM
10.	Taraghari-Dudhauli TL	Udyapur, Sindhuli	Katari M, Dudhauli M

Source: Field Survey

The summary of socio-economic and cultural baseline of the project site is present below:

Table 9: Ward level social baseline of the project site

S.N.	Project site	RM/M	Wards	Area (sq.km.)	HHs	Population			Caste/ Ethnic group
						Total	M	F	
1.	Godrang-Devnagar TL	Bharatpur M.C.	6,7,8,12	95.54	9702	18817	20273	39386	Chettri, Brahmin
2.	Bhandara-Manahari TL	Rapti M	1,2,3,4,5	52.64	5566	12334	13614	25948	Janjati, Chettri, Brahmin, Dalit,
		Manhari R.M.	6,7,8	52.13	3333	7691	8224	15915	Janjati
3.	Markhu-Palung TL	Indrasarowar R.M.	1	15.87	634	1452	1619	3071	Janjati, Dalit,
		Thaha M.	1,2,3,4,5	72.49	3816	8245	9101	17346	Janjati, Chettri, Brahmin, Dalit,
4.	Hattisure-Raigaun TL	Bakaiya R.M.	3,4	35.43	1647	3872	4181	8053	Janjati, Chettri, Brahmin, Dalit,
		Bagmati R.M.	1,4,7,8	114.88	2524	6324	6993	13317	Janjati, Chettri, Brahmin, Dalit,
5.	Chaughada-Kakani TL	Kakani R.M.	7,8	17.52	1118	2475	2667	5142	Janjati, Chettri, Brahmin, Dalit,
		Likhu R.M.	3,4,5,6	32.42	2419	5401	6121	11513	Janjati, Chettri, Brahmin, Dalit,
6.	Malta-Unichaur TL	Mahankal R.M.	1	12.59	334	813	884	1697	Janjati, Chettri, Brahmin, Dalit,
		Bagmati R.M.	3,5	30.98	816	1955	1980	3935	Janjati, Chettri, Brahmin, Dalit,
		Konjyosom R.M.	2	14.32	462	1109	1168	2277	Janjati, Chettri, Brahmin, Dalit,
7.	Rakathum-Katunje TL	Khadadevi R.M.	1	20.56	716	1550	1884	3434	Janjati, Chettri, Brahmin, Dalit,
		Sunkoshi R.M.	1	13.28	544	1075	1240	2315	Janjati, Chettri, Brahmin, Dalit,
		Temal R.M.	5,7,8,9	39.76	2494	5492	6316	11808	Janjati, Chettri, Brahmin, Dalit,
		Roshi R.M.	7,8,9,11	59.69	2322	5382	6039	11421	Janjati, Chettri, Brahmin, Dalit,
		Namobuddha R.M.	5	18.76	922	2051	2325	4376	Janjati, Chettri, Brahmin, Dalit,
8.	Jhurjhure-Mahabharat TL	Bagmati R.M.	4,5,9	109.72	1759	4659	4964	9623	Janjati, Chettri, Brahmin, Dalit,
		Khanikhola R.M.	4,5,6	12.45	1019	2827	3139	5966	Janjati, Chettri, Brahmin, Dalit,
		Mahabharat R.M.	1	19.96	359	1145	1115	2260	Janjati, Chettri, Brahmin, Dalit,
9.	Bhalche-Khaniyabas TL	Kispang R.M.	1,4	54.91	1176	2688	2986	5674	Janjati, Chettri, Brahmin, Dalit,
		Myagang R.M	4	26.17	459	917	1059	1976	Janjati, Chettri, Brahmin, Dalit,
		Khaniyabas R.M.	2,3,5	58.55	1765	3771	4621	8392	Janjati, Chettri, Brahmin, Dalit,
10.	Taraghari-	Katari M	3	18.24	1290	2878	3059	5937	Janjati, Chettri, Brahmin, Dalit,

S.N.	Project site	RM/M	Wards	Area (sq.km.)	HHs	Population			Caste/ Ethnic group
						Total	M	F	
	Dudhauli TL	Dudhauli R.M.	7,8,9,10	59.9	3890	8622	9759	18381	Janjati, Chettri, Brahmin, Dalit,
Total				**1957.77**	**96452**	**214100**	**236309**	**450983**	

Note: HH= Household, M=Male, F=Female

Source: Field Survey

Accessibility

All the subproject sites are accessible by road round the year. The construction of the TL will not be affected by the condition of the existing roads. The details of the access road to the subproject sites are given below.

Table 10: Details of the access raod to the sub-project site

S.N.	Name of the project site	Name of the access road	Remarks
1.	Godrang-Devnagar TL	Beeshazari-Gitanagar road	The TL passes along the road
2.	Bhandara-Manahari TL	E-W highway	The TL passes along the highway
3.	Markhu-Palung TL	Shera to mohini jharna road, Tasar to Khola kharga road and Palung Agro Motor bato	The TL passes along the road, feeder road
4.	Hattisure-Raigaun TL	Hetauda-Faparbari road	The site is beside the road
5.	Chaughada-Kakani TL	Likhukhola-Chaugada road	
6.	Malta-Unichaur TL	kanti lokpath road and Madhyawarti road, Yaspa-ikudhol-Magargaun rural road	Majority of the site goes along the road
7.	Rakathum-Katunje TL	B-P highway	The TL passes along the highway
8.	Jhurjhure-Mahabharat TL	Jyamire-Bhorleni-Taldhunga Feeder Road, Khopasi-Taldhunga Road, Taldhunga-Jagthali-Gokule Road	
9.	Bhalche-Khaniyabas TL	Myagang-Bachala Feeder Road, Solay-Deurali Feeder Road, Chamsapa Road and Bachala-Jharlang Road	Feeder road connects the site with the highway
10.	Taraghari-Dudhauli TL	Madanbhandari Lok Marga	The TL is along the road

Source: Field Survey

Settlements

There are altogether 16,476 households in the nearby settlement of the project sites. All the settlements have mixed groups comprising of different indigenous people, Dalits, Brahmins and Chetteris. The details of the nearest settlementsare given below:

Table 11: Details of the nearby settlement of the project site

S.N.	Name of the project site	Distance from the settlement	Name of the settlement	Total HHs	Ethnic Group
1.	Godrang-Devnagar TL	<200 m	Navjyoti Tole	104	Brahmin
			Shiva Mandir Tole	63	Brahmin
			Bageshwori Tole	110	Brahmin
			Bishhazari Simsar Tole	85	Brahmin
			Dakshinkali Tole	130	Dalit
			Bishhazari Tole	15	Brahmin
			Bandevi Tole	138	Brahmin/Chettri
			Salyani Tole	110	Brahmin/Chettri
			Sansari Devi Tole	100	Dalit/Janjati
			ShivaShakti Tole	63	Janjati
2.	Bhandara-Manahari TL	<200 m	Gadimai	200	Brahmin. Chettri
			Madahardi	200	Janjati
			Bhandara Bazar	200	Janjati
			Kanchan Basti	80	Chettri, Brahmin
			OmKareshwor	100	Chettri, Brahmin
			Naharbazar	200	Janjati
			Manakamana Chowk	160	Janjati
			Laxmi Narayan Chowk	200	Janjati
			Shivapuri	100	Brahmin
			Shivapur	50	Brahmin
			Ward Karalaya Pachase	100	Brahmin
			Simal Chowk	55	Brahmin
			Sajha Chowk	50	Mixed
			Mahakali Tole	100	Janjati
			Bamasdharti Tole	92	Brahmin
			Panchakanya Tole	30	Brahmin
			Bandevi Tole		Mixed
			Surdevi		Brahmin, Chettri
			Piple Tole	135	Brahmin, Chettri
			Lothar Bazar	70	Janjati
			Lothar Tole	400	Mixed
			Bhul chowk, Khaireghari	135	Janjati
			Sunadevi Tole	200	Janjati
			Naya Basti	100	Janjati
			Ramantar	170	Janjati
			Manndanda	80	Janjati
			Tallebijaune	70	Janjati
			Bijaune	65	Mixed
			Sameldanda	25	Janjati
			Nirmal Basti	130	Dalit
			Lama Basti	60	Janjati
			Manhari Bazar	150	Mixed
3.	Markhu-Palung TL	<400 m	Markhu	80	Janjati
			Dulsin Pakha	20	Janjati
			Dam Dhunga	35	Janjati
			Shera	30	Janjati
			Tasar	95	
			Gahate Tole	44	
			Okhar Bazar	140	
			Thana Bazar	90	Chettri
			Dobato	50	Janjati, Chettri

S.N.	Name of the project site	Distance from the settlement	Name of the settlement	Total HHs	Ethnic Group
			Phedi Gau	15	C
			Phat Bazar	60	Mixed
			Bista tole	30	Chettri, Janjati
4.	Hattisure-Raigaun TL	<300m	Hattiban	95	Janjati
			MulKhola	165	Janjati
			Garbari	250	Janjati
			Triveni	300	Janjati
			Bhaise	92	Janjati
			Aakash Tole	250	Janjati
			Himchuli	150	Janjati
			Paanch Pandav	100	Janjati
			Laliguras	100	Janjati
			Bankali	95	Janjati
			LokPriya	50	Janjati
			Lamitar	100	Janjati
			Pathibhara Chapat	150	Janjati
			Mathilo Lamitar	150	Janjati
			Kali Ved Ghari	70	Janjati
			Amrita	20	Janjati
			Buddha Darsan	30	Janjati
			Hattisure	350	Janjati
			Jhaljhale	275	Janjati
5.	Chaughada-Kakani TL	1000	SangamChowk	100	Rai,Newar, Brahmin, Chhetri
			Bagaicha	45-50	
		180-200	Gaekhar	100-150	Rai
			Pakhare	100-150	Newar
			Chap Gaun	70-80	Brahmin, Chhetri
			Chaugada Bazaar	150-200	Dali
		1000	Parsi dad Gaun	80-100	Brahmin/Chhetri, Janjati, Dalit
			Siddhiganeshstahn	50-60	Brahmin/Chhetri, Janjati, Dalit
		500	Majula	50-80	Brahmin/Chhetri, Janjati, Dalit
			Ramrajya	80-100	Brahmin/Chhetri, Janjati, Dalit
			Thumpka	40-70	Brahmin/Chhetri, Janjati, Dalit
		800-900	Budhune	80-120	Brahmin/Chhetri, Janjati, Dalit
			BiraliDanda	50-100	
			Bhangeri	50-80	
6.	Malta-Unichaur TL	25	Bhainse	40	
			Mahankal Kholcha	25	Brahmin
		50	Jhankridanda	25	Tamang
			Satkanya	15	Brahmin
			Bulakichaur	25	Tamang
		200	Chapeli	40	Tamang
		500	Bhattedanda	13	Brahmin
		40	Yaspa	22	Janjati
		150	Kalche	10	Tamang
		150	Sipdanda	15	Brahmin
			Bishuntar	17	Tamang

S.N.	Name of the project site	Distance from the settlement	Name of the settlement	Total HHs	Ethnic Group
			Kshetrigaun	19	Tamang and Brahmin
		20	Ikudol	44	Tamang and Brahmin
					Tamang and Brahmin
			Kharidanda	200	Magar
		500	Magargaun	150	Brahmin/Chhetri
		600	Sankhu	100	
		500	Gurungau	100	Brahmin Chhetri
		700	Sabdanda	100	Tamang
7.	Rakathum-Katunje TL	<400 m	Katunje	60	Janjati
			400 Gau	80	Janjati
			Kami Danda	130	Janjati
			Nepalthok	80	Janjati
			Aaapghari	40	Janjati
			Gajulidaha	100	Janjati
			Mangaltar	200	Janjati
			Karam Danda	70	Janjati
			Kaldhunga	60	Janjati
8.	Jhurjhure-Mahabharat TL	<500 m	Jhurjhure	40	Janjati
			Jyamire	200	Majhi
			LIlaban	200	Janjati
			Bageri	100	Janjati
			Take	200	Janjati
			Borleni	200	Janjati
			Farsa	25	Janjati
			Thulo Baldev	10	Janjati
			Goth Danda	8	Janjati
			Aap Danda	5	Janjati
			Agautye	25	Janjati
			Jagthali	50	Majhi
			Taldhunga	150	Mixed
			Fuldanda	19	Janjati
			Thade	8	Janjati
			Sano Baldev	30	Janjati
			Ratmate	18	Janjati
			Majhitar	35	Janjati
			Nagpani	25	Janjati
			Mandir Danda	40	Chettri, Brahmin
			Majhitar Kalsingh	36	Janjati
			Chote Sahar	45	Janjati
			Mayom Danda	13	Janjati
			Bhairav Mavi School Tole	17	Janjati
			Magar Tole	38	Janjati
			Gokule	70	Janjati
			Arubot	68	Janjati
9.	Bhalche-Khaniyabas TL	<300 m	Bhalce	420	Janjati
			Salme	100	Janjati, Dalit
			Thulo Gau	180	Janjati
			Ghale Gau	100	Janjati
			Gunsa Gau	110	Janjati
			Kintang	600	Janjati
			Gangmrang	25	Janjati
			Bachala	45	Janjati
			Golsi	150	Janjati
			Pati Gau	65	Janjati

S.N.	Name of the project site	Distance from the settlement	Name of the settlement	Total HHs	Ethnic Group
			Archat	70	Janjati
			Maur Gau	30	Janjati
			Mane Gau	10	Janjati
			Temrang	12	Janjati
			Bragu	15	Janjati
			Kokhim	55	Janjati, Dalit
10.	Taraghari-Dudhauli TL	<200 m	Katari	700	Mixed
			Debidhap	50	Janjati
			Rajabas	70	Janjati
			Taraghari	60	Janjati
			Amtari	60	Janjati
			Thami tole	31	Janjati
			Dami Tole	110	Mixed
			Dham Tole	170	Mixed
			Simle Tole	75	Janjati/Chittri
			Pokhare	200	Mixed
			Shankhartar	125	Chettri
			Khorbhanjyang	142	Brahmin, Chettri
			Namuna tole	35	Chettri, Brahmin
			Danda Tole	30	Chettri
			Titakani	20	Dalit
			Aap Danda	50	Mixed
			Dokan Danda	90	Mixed
			Lakhima	160	Chettri/Brahmin
			Gayar Khora	130	Janjati
			Dabrekuna	100	Brahmin

Source: Field Survey

Other Institutions and Infrastructures

The educational institutions, market centers and other facilities/infrastructures near the project sites within 500m of TL route are given below:

Table 12: Details of the institution and other infrastructures near the project site

S.N.	Name of the project site	Electric Lines	Educational Institutions	Religious Sites	Health Institutions	Markets	Others
1.	Godrang-Devnagar TL	Bharatpur and Chanauli	Arunodaya secondary school, Shree secondary school, Sahid Smirti secondary school, Dev Jyoti secondary school	Laxminarayan mandir, Bishazari taal, Dakshinkali Mandir, Shova bhagwati, Sansaridevi, Durga Mandir, Bandevi mandir	Ganesh Health post, Newton Hospital (under construction)	Narayangargh Bazar	Kumari Bank, NIC Asia Bank
2.	Bhandara-Manahari TL	Hardi Bhandara, Hetauda-Chitwan	Shree Shikar Rastriya adharbhut, AdarsaVidhyaa sharm, Sangrila Boarding School, Bhandara H.S.S.	Naagdaha, Omkaryeshwor Mandir, Shree Krishna Mandir, Shree Bageshwori Mandir, Mukundeshwor Mahadev, Brahmasthani, Sundarbasti church	Bhandara Hospital Primary health service Manhari primary health post	Bhandara Bazar, Shikar Basti Bazar, Lothar Bazar, Manhari Bazar	Muktinath Bank, Century Bank, NIC Bank, Rapti Division Forest, Atirikta Post office, Prabhu Bank, Shivapuri Co.
3.	Markhu-Palung TL	Kulekhani	Shree Saraswoti Bal Bodini Ma.Vi. Shree Durga Devi Adharbhut, Jhamkesh wori Ma. Vi, Ghatdevi Adharbhut School, DeepJyoti English	Nateshwor Temple, Barahi Mandir, Jhamkeshwori Mandir, Pandukeshwor Mahadev, Akashe Devi, Sankata, Mangaleshwor,	Markhu Health Post, Palung Health Post	Palung Bazar Phat Bazar Thana Bazar Markh u Bazar	Indrasarovar Agriculture Co., Shreejana Mahila Co., Indrasorvar Lake, Markhu Substation, NEA Office, Fishery Office Nepal Bank Ltd, Mahalaxmi Bank,

S.N.	Name of the project site	Electric Lines	Educational Institutions	Religious Sites	Health Institutions	Markets	Others
			Boarding School	Chundevi			Palung Multipurpose
4.	Hattisure-Raigaun TL		Bal Bikash School, Shree Surya Ma. Vi, Tankesh wor Ni Ma.Vi, Shree Bhaiseshwor Bandevi Ni Ma. Vi., Saraswoti Pra. Vi, Bhairav Pra. Vi., Janata Ma. Vi	Shiva Mandir, Tashi Gumba, Hattidhunga Shakti Mandali, Alohun Church, ChrisMa hima, Believer Church, Goshbel Rudreshwor Mahade v Mandir, Tashi Pema Gumba	Pathibhara Health Post, Hattisure Community Health Post	Hattisure Market, Phapharbari Bazar, Samjhana Bazar	Sano Krishi Savings, Namuna Jadibudi Cooperative, Jhurjhure Police Station, Sanima Bank, Century Bank, NIC Asia Bank, Sahayatri Co., Civil Lagubitta, Mirmire Lagubitta, Police Station, Sub division
5.	Chaughada-Kakani TL	-	Mahendra Ma Vi, Kshetrapal Adarbhut, Brahmayani Adarbhut, kalika school	Shiva mandir, Gumba, Radha Krisha Mandir	Chaturale Health post, Kakani Health post,	Putali Chautara, Chaturale bazar, Ranipauwa	Manbihit Agri Cooperative, Global IME, Jyoti Bikas Bank,
6.	Malta-Unichaur TL		Bagmati Primary School, Guru lower Secondary School, Mahakali Devi Secondary School, Sarada Siksha Sadan	Baghbhairab Temple, Siddhadevi Mahadev, Krishna Mandir, Mahakalidevi, Kaleshwor	Bukhel Health Post, Chapeli Health Post,	Ikudol, Gadi Bazar, Unichaur, Pokhari	Ikudol Post office, Community Learning Center, Satkanya water lifting and drinking water and reservoir tanks
7.	Rakathum-Katunje TL		Rakathum Ma Vi, Bageshwori Adharbhut, Khadadevi Adarbhut, Gopi Aadarbhut, Kusheshwor Ma Vi,	Bishwamitra Gufa, Pema Choiling Gumba, Kusheshwor , Khadadevi, Topu Bagbati, Bhimsenthan,	Rakathum Health Post, Dhulikhel Community hospital, Kuseshwor Aayervedic hospital, Katunje	Lubu bazar, Nepalthok , Gajuli Dada, Katunje, Mangaltar	Rotim Agriculture service, Dugda Bikash Sansta, Rotim Agro, Pauwa Agro, Sauvagya Mahila Agro, Siddartha Bank, Post office, Forest office

S.N.	Name of the project site	Electric Lines	Educational Institutions	Religious Sites	Health Institutions	Markets	Others
			Nepalthok Pra Vi, Devisthan Ma. Vi Pragati Boarding	Devisthan, Krishna Mandir, Shiva Mandir, Seale Church	Health post		
8.	Jhurjhure-Mahabharat TL		MahaBuddha School Pancha Kanya Ni Ma Vi Baagbhairav Adarbhut Janakalyan Adarbhut Janahit Aadarvut, Aadarsha Janapriya Aadarvut, Debaki Ma.Vi, Bagmati Aadarvut, Gita Aadarvut, Janakalyan Ma. Vi.	Deurin Mahadev Mandir, Pashupati Mandir, Tasi Highland Gumba Mahadev Mandir, Chaitya, Gumba, Believer Eastern Church, Tshi choiling Gumba Baagbhairav Mandir	Panchakanya healthpost, Borleni Health Post, Bajhgau Health Post, Taldhunga Health Post, Gokule Health post	Taldhunga bazar, Bhorleni bazar, Faparbari, Jaagthali bazar, Jhurjhurey,	Jhurjhure Police Station, Sanima Bank, Infinity co. Janachetana, Mahila Savind and Credit Co SBI Bank, Suryamukhi Bachat, Taldhunga Cooperative Police station, post office Danda pari mahila Sahakari Bhairav Saving and Credit cooperation
9.	Bhalche-Khaniyabas TL	Bhalche	Jalchu khola Ma.Vi, Nuchat Pra.Vi, Durgam Jar, Dcap Pra.Vi, Sachet Pra.Vi Salme Mavi, Kanya Deve Adar Vidhyalaya, Kalika Bhumi Pra.Vi, Himalayan Revival Boarding Shri Sonu Kimtang Ma.Vi, Chandra Devi Aadarbhut Vi,Gyanjyoti Aadarbhut.Vi,Pac	Gungar Gumba, Urken Tulku Gumba, Pemaling Gumba Dhelchet Gumba, Tashi Gumba, Gursa Church,Kusu Gumba Phrumtang Gumba, Hise dhechling Boudha Gumba, Mohitel Gumba, Mohitel Gumba, Manewang Paling, One way Church, Manetar	Bhalche Health Post, Bhalche Khop, Salme Health Post, Kintang Health Post, Kokhi Health Post,	Nepalchok, Bachala, Devisthan, Manegang, Thulo gau Bazar, Balche Besi, Nuchet	Sirjansil Cooperative, Aama Sahakari, Nuchet Sanakishan Cooperative, Jelju Cooperative, Kintang Agriculture Cooperative,Shahid Pratima Bahudhyasa Cooperative, Santung Chiyu Cooperative

S.N.	Name of the project site	Electric Lines	Educational Institutions	Religious Sites	Health Institutions	Markets	Others
			het Pra.Vi	Church			
10.	Taraghari-Dudhauli TL	Taraghari	Saraswoti Ma. Vi Ada. Vi. Churiya Tawashree English boarding school Future star boarding schoolPrabhat English boarding school Sagarmatha H.S.S. Kamala Mai Campus, Mahendra Adhabir Ni.Ma.Vi, Gaurishankar Pra.Vi, Ram Janaki Pra.Vi, Kamala Mai Secondary School, Little Flower English Boarding School	Gidhwar Raja Rani Mandir, Chandeswori Kirateswor Mahadev, Hanuman Mandir, Durga mandir, Radha Krisha,Shiva Mandir, Dewarthar Mandir Shiva Mandir Laxmi Narayan Mandir	Ladathir Health Post, Adharbhut health post Sagarmatha hospital, Katari model hospital Aastha hospital - 7 clinics	Katari Bazar, Dudhauli, Hanuman Bazar	Centry Bank,Siddhartha Bank, Nepal Bank Ltd. Srijana Lagubitta, Forward lagubitta, Jivan Bikash lagubitta,Santora Cooperative, Bharosa Cooperative, Milijuli Cooperative, Puspanjali Cooperative Machhapuchhre Bank, Muktinath Bank, Global IME, Siddartha Bank, Century Bank, Rastra Banijya Bank, Agricultural Development Bank, Nabil Bank, Siddartha Bank. Police station

4 Project Impacts and Mitigation Measures

The SIDP is classified as category B on the environmental ground due to limited adverse impact on environmental and social impacts which is site-specific, largely reversible, and can be readily addressed through mitigation measures.

The Godrang-Devnagar TLand Bhandara-Manahari TL lie nearby the protected area buffer zone. Other project doesn't lie in any protected areas. All the project has no significant impact in any sensitive ecosystem and has avoided areas of historical and cultural significance. The major impact of the transmission line projects is associated with clearing the vegetation, disturbance on agricultural land during construction, waste management of the labor camp, occupation, and community health safety during construction. However, agricultural land under RoW will be only restricted for construction and allow for cultivation. Most of the impacts associated with the construction of the projects were limited and can be addressed and are temporary in nature. Impact and its mitigation measures for the proposed in the matrix in 4.1, which will be implemented during the different phases of the project implementation

4.1 Impacts and mitigation matrix

4.1.1 Environmental Impacts

The physical and biological impact associated with the construction and operation of the project presented in table 4.1 the construction and operation of the proposed ten 33/11 kV TL project has minimum impact on the physical aspect of the project location and are site-specific and can be minimized. Land-use change during the pole erection will be restored to its original condition as far as possible. The line will be designed in such manner to avoid loss of tree during the construction phase. Details of impact and mitigation measures adopted during the implementation of the project are given in table 4.1

4.1.2 Social Impacts

The project will affect some section of agricultural land for pole foundation and RoW clearance. Social screening was carried out in all sites but no adverse social impacts were identified. However, some impacts identified were: noise, dust, risks of accident, issue related to labor-management like labor camp hygiene and sanitation, potential conflict between local community and laborsduring the construction period of the projects. The adverse impact related to social issues and the potential mitigation measures are presented in table 4.3

The proposed TL project does not result in any kind of physical or economic displacement. All the land area to be used for pole foundation and RoW are free from squatters and encroachers. Most of the TL passes through barren land and goes along the road way. Some portion of the TL passes through agricultural land causing minor impacts on land, crop/ trees.

The project will require117.29 ha of land for RoW clearance for the project, of which 20.46 ha passes through agricultural land, 28.38 ha passes through forest area and remaining land passes through other land type. There may be loss of standing crops during construction period due to project activities. The objective of this ESMPis to assistproject to avoid all the cultivated land as far as possible and minimize advesrse impacts. If it is unavoidable, preference will be given for the construction of TL during post harvesting or lean agricultural season so that standing crops are not damaged or the damage is minimum.

The 33 kV TL requires 0.076 ha of land for installation of 3786 number of poles in all the project areas, 917 poles will be erected on agricultural land and 982 poles on forest area. The area for single pole foundation is 0.45 m x 0.45m.

The construction works do not lead to other major adverse impacts to the local people, particularly in terms of loss of their properties viz. houses, income, employment or their access to natural resources related to their livelihoods.

4.1.3 Impacts on Indigenous People:

The transmission line alignments passes through different settlements resided by mixed caste groups including indigenous community. The project works do not cause any noticeable adverse impacts on indigenous people like loss of income, employment, or restricted access to their resources for livelihoods. Nevertheless, in some sections of transmission lines, there might be some impacts, although minor. These would include: lines passing through the lands of IP land, erection of poles in their land and crop damage during construction works. In order to address these issues, close consultations will be carried with the IP families as well as other poor and vulnerable groups during pre-construction and construction period so that possible loesses/damages could be identified with appropriate measures. As a short term measure, the project will provide opportunities for these groups in different ways i.e., employment in project works, increased business opportunities, increased income, increased land value, transfer of skills etc.

The project will do regular communication and consultation with stakeholders and ward/RM/Municipalrepresentatives before and duringtheimplementation/construction of the project to appraise the progress of the project and its impacts and also collect the opinion and views regarding the project. Record of the consultation with PAF, representative, and local authority will be documented and maintained by the project.

S.N	Potential Issues	Project Issues	C/O Phases	Impacts	Mitigation Measures
	4.1 Physical Environmental Issues				
1	Changes in Landuse	All sub-project sites	C	The landuse changes due to erection of poles and clearance along Row of the TL. A total of 117.29 ha land in RoW and 0.076 ha for pole erection will be impacted. Details is provided in Chapter 2.2	• Land for pole installation and RoW will be obtained through prior consent of the affected people through consultation process. • The labor camp will be proposed in the barren land and the temporary facilities setup for the construction will be restored and rehabilitated to original status to minimize the land use impact
			O	The land under the RoW will be restricted for the erection of any type of public and private structures except for plantation of dwarf trees species.	• The land under the RoW will not be restricted for the cultivation.
2	Air Quality	All sub-project sites	C	The construction activities and transportation of material will generate dust, fugitive smell due to vehicular movement, which may cause temporary air pollution and have a health impact onthe community. Open burning of solid wastes from labor camps and use of firewood also pollute the surrounding	• Water will be sprayedon the access road to reduce the dust problem. • Open burning and use of firewood will be prohibited • Clean fuel source will be provided to labor for cooking • Regular maintenance of construction vehicles and machinery will be done
		All sub-project sites	O	No impact on air quality during the operation phase	• No mitigation measures will be taken
3	Noise Quality	All sub-project sites	C	Noise will be generated by the vehicular movement during the construction period. The noise and vibration by machinery during construction are insignificant because of the project nature (33/11 kV) which is expected though have an insignificant interruption to community	• The construction work will be limited to daytime as far as possible • Informed local community before starting the construction activities • Measurement of the noise level in the respective schedule in the construction phase. • Construction hours will be done only on normal days
		All sub-project sites	O	Noise generated during the operational phase will be generally from a vehicular movement which is expected to negligible	• No mitigation measures required during the operation phase

4	Waste Management	All sub-project sites	C	The improper disposal of the solid waste, muck, and fecal waste generated from the construction works, labor camps might cause the sanitary problem to construction labor and the local community	• Domestic Solid waste segregation is biodegradable will be buried. • Recycle wastes such as plastics, metal can, the glass will be collected and segregate respectively and managed as per practice. • No waste will be disposed along the public road and places in the project surrounding • Construction workers were aware of managing the waste from labor camps. • The contractor should build the toilet as per the number of labor involved in the construction and should be responsible for waste management at construction sites and labor camps.
			O	The personnel involved in the operation phase will generate the domestic solid waste	• The domestic waste consists of organic waste and can be easily managed by burying or through a municipal waste collection system. Solid waste should be managed as per municipal practice.
	4.2 Biological Environmental Issues				
1.	Godrang-Devnagar TL	Impact on Forest Area and Standing Trees	C	There will be impact on 0.94 ha of forest area with approximate loss of 217 number of trees	The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
2.	Bhandara-Manahari TL		C	There will be impact on 0.9 ha of forest area with approximate loss of 422 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•

3.	Markhu-Palung TL		C	There will be impact on 0.75 ha of forest area with approximate loss of 321 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
4.	Hattisure-Raigaun TL		C	There will be impact on 0.56 ha of forest area with approximate loss of 413 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
5.	Chaughada-Kakani TL		C	There will be impact on 3.3 ha of forest area with approximate loss of 496 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
6.	Malta-Unichaur TL		C	There will be impact on 5.2 ha of forest area with approximate loss of 464 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
7.	Rakathum-Katunje TL		C	There will be impact on 1.2 ha of forest area with approximate loss of 264 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of	•

				tall trees will allow growth of shrubs and short trees	
8.	Jhurjhure-Mahabharat TL		C	There will be impact on 1.5 ha of forest area with approximate loss of 79 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
9.	Bhalche-Khaniyabas TL		C	There will be impact on 13.73 ha of forest area with approximate loss of 216 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
10.	Taraghari-Dudhauli TL		C	There will be impact on 0.3 ha of forest area with approximate loss of 52 number of trees	• The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.
			O	Only trees which grow under the RoW after some years might need to be cleared. Regular trimming of tall trees will allow growth of shrubs and short trees	•
11.	All subproject sites	Impacts on wildlife	C	Restriction in movement of wild fauna, loss of habitat, possibility of hunting and poaching activities by laborers are the potential impacts.	• Minimization of habitat loss, compensatory plantation, restriction on hunting and poaching, supply of alternative fuel to workers, restriction on illegal felling of trees, restriction on extraction of forest products.
			O	Avian collisions, impacts due to on site/off site maintenance activities.	•
	4.3 Social Issues				

1	Land, Crop, and tree loss in private land	All sub-project sites	C	The TL passes mainly through barren land, along the road and also through agricultural land and forest area	• The land for pole erection does not need to be acquired. The private land will be avoided as far as possible during installation of the pole. Poles will be erected on the edges /corners of land parcels to minimize the impact. All works related to poles and lines in private land will be carried with full consent and consultation of the owners.
		All sub-project sites	O	No impact during the construction phase	• No mitigation approach will be adopted
2	Impact on indigenous People	All sub-project sites	C	Indigenous people and women will likely be affected, lost income, etc.	• The project will provide some assistance to such group of people in the form of community support program like livelihood enhancement program, skill development programmeas required by the needed community as per the decision of NEA Management etc.
3	Occupational Health and Safety	All sub-project sites	C	Impact on health and safety of the workers and there may be occupational injuries/accidentsof the workers.	An on-site medical facility and first-aid will be provided for the construction workers. • Personal protective equipment (Hard hats, gloves, and steel-toed shoes with rubber soles) for workers will be provided, when necessary, to minimize health and safety risks. • Education on basic hygienic practices to minimize the spread of tropical diseases, including information on methods of transmission and protection will be given by the public health expert before the construction phase. • Prohibition of drugs and alcohol on the construction site. • Fencing of the construction sites with signboards required. • Any incidence of accidents will be reported to World Bank within 24 hours.

		All sub-project sites	O	Impact on health and safety of project personnel in operational phases	• All occupational health and safety requirements will be in place on sites during the operation period. • The operational Manual and professional training manual will be at all times in the facility. • There will be sufficient funds available to carry out periodic maintenance and repairs of equipment.
4	Change in aesthetic Value	All sub-project sites	O/C	The erection of the TL would result in an immitigable visual impact because it would create a change to the existing landscape. It would introduce blockage and glare. This may destroy natural beauty.	• The significant impact of TL poles on aesthetic value cannot be mitigated completely.
5	Labor influx and labor use including child/forced laborand labor camps	All sub-project sites	C	An increase in the number of labor leads to the issue of health and sanitation of the workers and also the solid waste management produced in the labor camp.	• Since the number of labor will be very small in size for each subproject site, labor camps will be established within the premises of the substation and along the alignment area. • The labor camp will be provided with a simple dry pit toilet constructed on hard ground and far from water sources. • First aid kits will be maintained for preliminary treatment in emergencies. • The domestic solid waste generated in the project area will be either buried in designed landfill areas or converted into compost. • Piped water from nearby communities or tankers will be provided to the workers for drinking water purposes. • Use of child/forced labor and wage discriminations will be prevented through awareness raising of contractors and regular monitoring at site.
		All sub-project sites	O	The construction workers will be returned and the construction camp will be destroyed.	• No mitigation measure is required.
6	Structure loss	All sub-project sites	C	Private and public structures will be avoided for the construction of the project	• No mitigation measures required

		All sub-project sites	O	No impact in the operation phase	• No mitigation measures required
7	Construction Related transportation and carrying of material	All sub-project sites	C	An increase in the vehicle movement for transportation of construction material, which increase the traffic flow can cause the dust problem in the project location and also emission from the vehicle create temporary air pollution, increase in the probability of road accident and issues in pedestrian safety	• Manage the vehicle movement in such a manner that the project location will have less traffic and cover the loaded truck to minimize the dust problems • Use water spray to reduce the dust problem during loading and unloading of construction material • Regular maintenance of the machinery used in construction to reduce the emission and noise pollution from machinery • As far as possible and practicable, maintain the vehicle movement in low traffic hours • Implement safety procedures during transportation of construction material to avoid road accidents and loss of life of construction labor • Placement of traffic signs and construction-related precaution signs in a strategic place in the community to avoid accidents.
			O	No impact in the operation phase	No mitigation measures required
8.	SEA/SH issues	All sub-project sites	C	Increase in number of labors may lead to misconduct, unacceptable acts, sexual favour and sexual abuses	• The labor camp should be located far from the community or settlements. • Restrictions on consuming any kinds of alcohol and tobacco during the construction phase. • Restrict labors from going out of labor camps unless it's necessary. • Contractors will be made aware on SEA/SH issues and compliance of code of conduct.
			O	No impact in the operation phase	• No mitigation measures required

- While installing the pole and stringing the line, private land and loss of trees will be tried to avoid.

5 Environmental management activities and Organizational setup

5.1 Environmental Management Plan

5.1.1 Impact Mitigation Matrix

This environmental management/mitigation plan would provide clear guidance to the project authority and contractor when and how the mitigation measure should be implemented. The identified impacts due to project activities and the mitigation measures are explained in the table below.

S.N	Issues	Impact	Mitigation Measures	Location	Timing of Action	Estimated Cost	Institutional Responsibility	
							Implementation	Supervision
5.1	**Common Issues for all TLProjects**							
1	Changes in Landuse/temporary requirement of land	RoW impact and pole erection in private land Temporary land for labor camp and storage facilities and forest/tree clarance	Prior consent/consultations with owners for use of land The camps site is proposed in the substation area and temporary facilities will be restored to original status minimize the land use impact	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
		The landunder the RoW will be restricted for the construction of any infrastructure except cultivation of crops and dwarf plant species	The land under RoW will not be restricted for the cultivation of crops by the owners as they were doing before the project implementation	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
2	Air Quality	The transportation of the construction materials, substation construction and vehicular movement of project activities will generate the dust in the surrounding area of the project	Spraying of the water along the earthen and local road use by project, near settlement. Helmets and mask will be labor/workforce	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

3	Noise Quality	Noise generated from the vehicular movement, machinery and construction works will degrade the noise quality of the project area surrounding	Regular inspection and maintenance of the construction vehicle and machinery, limiting the construction work in daytime and earmuff will provided to worker as per need	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
4	Waste management	The improper disposal of solid waste like cement bags, iron bars and other construction leftover and waste from the labor/labor camps might cause the sanitary problem to the local people and worker themselves.	Domestic Solid waste segregation are biodegradable will be buried, recycle wastes such as plastics, metal can, glass will be collected and segregate respectively and managed as per practice, Nowaste will be disposed along the public road and places in project surrounding, Construction worker were aware of managing the waste from labor camps, Contractor should build the toilet as per number of the labor involved in the construction and should be	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
		The personnel who involved during the operation phase will generate domestic sold waste.	Domestic solid waste will be managed by burying in pits.	Sub-Project Sites	Operation	Project Cost	GSEEP	GSEEP /ESSP

5	Construction Related transportation and carrying of material	Increase in the vehicle movement for transportation of construction material, which increase the traffic flow can cause the dust problem in the project location and also emission form the vehicle create temporary air pollution, increase in probability of road accident and issues in pedestrian safety	Manage the vehicle movement in such manner that the project location will have less traffic and cover the loaded truck to minimize the dust problems, Use water spray in the to reduce the dust problem during loading and unloading of construction material Regular maintenance of the machinery used in construction to reduce the emission and noise pollution from machinery, As far as possible and practicable, maintain the vehicle movement in low traffic hours, Implement safety procedures during transportation of construction material to avoid the road accidents and loss of life of construction labor	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
6	Occupational Health and Safety	Impact on health and safety of the workers and there may be the occupational injuries to the workers.	On-site medical facility will be designed to provide the primary health facility to workers, Personal protective equipment (safety helmets,	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

			gloves and steel toe shoes with rubber soles will be provided to worker Awareness on basic hygiene practices will be provided to workers					
7	Change in aesthetic Value	The erection of the TL poles would result in an immitigable visual impact because it would create a change to the existing landscape. It would introduce blockage and glare. This may destroy natural beauty.	The impact on the aesthetic values due to project construction cannot be mitigated completely	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
8	Labor influx and labor camps	Increase in the number of labor leads to the issue of health and sanitation of the workers and also the solid waste management produced in the labor camp.	Since the number of labor requirement is small for each project, labor camps will be established within the project premises. Labor camp will be provided with simple dry pit toilet far from water sources First aid kits will be maintained in the labor camps for emergency Waste generated from the labor camp will be buried or managed in designated landfill	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

			Locally, available piped water or tanker will be provided to worker for drinking and other purpose					
5.2 Specific issues								
1	Impact on land due to TL poles	Altogether 917 no. of poles will be erectedin the agricultural land but as far as possible private land will be avoided while installing the pole. There may be loss of standing crops during construction	There is no provision in NEA to provide compensation for 33kV Line and poles. Preference will be given to erect the poles during the lean season to avoid the loss of standing crops. Poles will be erected along the edeges/cornors of land parcels. In case of loss of standing crops, project will provide the cash compensation for the loss fixed on the basis of productivity of the area determined by DAO under leadership of project manager, representative of corresponding ward/RM or Municipality and affected people	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
2.	Impact on forest area and standing trees	A total of 28.3 ha forest land falls under TL alignment. A total of 2944 number of trees will	The line will be designed in such manner to avoid loss of tree during the construction phase so compensatory plantation is required.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

		be cut down during RoW clearance. Tree area will be avoided during the construction phase.						

5.1.2 Permits and Approval

Permit and approval relevant to the proposed project construction is shown in the table

Issues	**Authority**	**Approval and permits**
Works in Private Property and land	Landowners	Approval
Relocation or disturbance to infrastructure such as telephone line, footrails and tracks ectc	Respective authority, local user groups, RM development committee, Ward Office	Approval

5.1.3 Grievances redress plan

Grievance redress mechanism (GRM) will be established to allow project affected families/households (PAFs/HHs), community or other stakeholders to appeal any disagreeable decisions, practices, and activities arising from project related advese impacts, and environmental and community concerns related to the project. GRM for any type of issues /complains provides an effective approach and their resolution in an amicable way. Considering this, a Grievance Redress Cell (GRC) will be established at the project level as required by the projects.The GRCwill consist of the following members.

Project Coordinator, Coordinator

Project Manager, 33 kV DSE & R Component, Member Secretary

Officer from Concern Rural Municipality/Municipality, Member

Secretary, from Concern Rural Municipality/Municipality, Member

The field-level GRC will be formed after the commencement of work in the site. Till then the project level GRC will look after the grievances, if any. The GRC maintains registration books and files to keep the records of complaints filed by the affected people and community. The GRC seeks to resolve the issues quickly to expedite the project works without resorting to expensive and time-consuming legal actions. The budget for setting up the grievance cell has been provided by the PMO itself.

All the grievances or complaints filed at local level will be resolved by the field level GRCs. However, grievances not resolved locally or beyond the capacity of local GRC will be forwarded to the GRC at the center which will be responsible to address them on a timely manner.

5.1.4 Public Disclosure Plan

Disclosure of ESMP is expected to be helpful to the local people to be aware about the project and provision of compensation and other assistance. The final ESMP report will be disclosed in NEA-ESSD Website. The hardcopy of the project will be kept in the CDO office of the project affected district, project office, ESSD office and ESSD project unit office. The copy of ESMP will be disclosed on the World Bank website and project-related websites (www.nea.org.np).

6 Environmental Monitoring Plan

Monitoring is an essential aspect of the environmental and social management plan. Effective monitoring of the whole project cycle will assist the implementation of project works in coordination with concerned stakeholders. It will also help identify the unexpected problems/outcomes that might occur due to imacts on the physical, biological and socio-economiccondition and facilitate the correction of issues on time. Land use pattern, settlement, health and safety, infrastructure, implementation of the mitigation measures will be covered by monitoring.

NEA/ESSD is responsible for regular monitoring and reporting of the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will be carried out at project level activities regularly.

To evaluate the application and effectiveness of the mitigation measures proposed for the project, a monitoring program has been designed as follows. s.

a. Construction Monitoring

During the project construction phase, construction activities /impacts and compliance monitoring will be conducted.

b. Impact Monitoring

Impact monitoring will be carried out to assess the actual level of impact due to project construction. The impact monitoring includes:

- The impact of the project on the physical, biological and socio-economic, and cultural environment of the project area,
- The accuracy of the predicted impacts during the EMP,
- The effectiveness of the mitigation measures, and
- Identify the emerging impacts due to project activities or natural processes and develop remedial action.

6.1 Compliance Monitoring

The compliance monitoring will be conducted during the construction phase of the project to monitor the compliance of the proposed mitigation measures and monitoring activities. The compliance monitoring will mainly focus on;

- Timely and adequately implementation of the Environmental Management Plan
- Compliance of the tender clause
- Compliance of the mitigation measures, and
- Overall environmental and social performance of the project.

Table 13: Environmental Monitoring Plan

S.N.	Parameter	Indicators	Method	Location	Schedule
A	**Construction Monitoring**				
Impact Monitoring					
PhysicalEnvironment					
1	Air Quality	Dust around the project area	Observation	Settlement near substation	Twice in the season
2	Noise Quality	Decibel(dBA) as per GoN Standard	Measurement of Noise level using an instrument	Settlement substation	Twice in the season
3	Waste Management	Unpleasant odor and visual impact	Observation	Labor camp/ construction sites	Weekly during construction
4	Construction-related transportation and hauling of materials	Use of water spray and placement of hoarding board around the construction sites	Direct observation	Construction area	Construction period
5	Occupational Health and Safety issues	Impacts on health of the workers; No. of accidents; use of personal protective instrument by the workers	Inspection of the construction place; Records of diseases and accidents	Construction sites	Continuous during construction period

S.N.	Parameter	Indicators	Method	Location	Schedule
6	Employment	No. of local people employed by the project	Records kept by management	Construction area	Continuous during the construction period and annually during operation
7	Labor camp	Toilet and drinking water facility, availability of first aid kids in a labor camp	Observation, consultation with the labor force	Construction area	Construction period
BiologicalEnvironment					
1	Vegetation clearance and felling of a tree	Line Stringing	Site-Verification of no. of trees but cut of tree will be avoided as far as possible	All the project sites	During the Construction Period
2	Wildlife	Wildlife Habitat and clearance	Observation, discussion with local people, keeping a record of wildlife, birds, and reptiles	All the project sites	During the Construction Period
Social Environment					
1	Land loss/ RoW Land	The area occupied by a single pole and cash assistance /compensation payment for pole foundation and RoW land	Consultation with the affected people, CDC decision, project records	Affected area	During Construction
2	Crops/tree loss	Actual damage to standing crops or loss of cropping season for particular area and	Observation and discussion with affected people, contractor and project	All project area	Construction Period

S.N.	Parameter	Indicators	Method	Location	Schedule
		compensation payment for crops/fruit/tree losses			
Compliance Monitoring					
1	Provision of clauses related to environmental and social safeguard mitigation measures in tender document and allocation of adequate budget for implementation of environmental mitigation measures identified in ESMP and monitoring works	Yes/No	Review, inquiry and consultation	Kathmandu Office	Preconstruction phase

Note: - Environmental and social issues and mitigation measures identified in this ESMP will be subjected to updated during the project construction period and mitigation measures will be revised and implemented accordingly if any

7 Institutional arrangement and mechanism

NEA-ESSD and GSEEP Project team are responsible for the monitoring and reporting of the implementation of the mitigation measures adopted for the project in coordination with the local authority and concerned ministry and departments.

8 Reporting

NEA/ESSD is responsible for regular monitoring and reporting of the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will be carried out on regular basis.

The experts from ESSD will visit the project site as per requirement for the environmental monitoring of the project and prepare the monitoring report. The project manager's office (PMO) will be responsible for the distribution of the report to the concerned agencies. The detail of monitoring parameters, schedule, method, and agencies to be consulted during construction and operation phases for the physical, biological and socio-economic, and cultural environment is presented in the table 13.

9 Environmental Management Cost

The mitigation cost and CSP for the proposed project should be at least 0.5% - 1% of the total project cost. The amount is for implementation of the mitigation measures and monitoring activities adopted in this ESMP report.

10 Annexes

10.1 Photographs of Field Surveys

Consultation meeting with local people

Consultation meeting at Rapti -05

Consultation meeting with ward members and locals of Rapti 01

Beluwa tole near substation

Hardi Substation. It is the tapping point

Consultation meeting with locals in Rapti 01

Consultation meeting near Substation site

Bhandara Bazar

Manakama Temple

Manhari Bazar

Consultation meeting at Roshi R.M. Office

Proposed Katunje substation location

	
Public consultation near Rakathum Substation	Public consultation near Katunje Substation
	
Consultation meeting at Ward office 04, Kispang R.M.	Consultation meeting with locals at Kintang
	
Consultation meeting at Jalchu Khola Ma Vi	Consultation meeting at ward office 2, Khaniyabas R.M.

Meeting at ward office 8, Dudhauli M.

Meeting at ward office 9, Dudhauli M.

Consultation meeting at Ward 10, Dudhauli M.

Consultation meeting at ward office 7, Dudhauli M.

Meeting at Ward 7, Dudhauli

Proposed Dudhauli Substation Location